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Vulcanization of Rubber

By

Organic Peroxides or by Ammonium Persulphates

IWAN OSTROMISLENSKY[1]

¶ Vulcanization by trinitrobenzene was the subject of Dr. Ostromislensky's paper published in the June issue of this journal.

¶ In the present article he discusses the results obtained with seven rubber stocks vulcanized with benzoyl peroxide.

¶ The cures of these stocks ranged from 1 or 2 minutes at 13 pounds, to 25 minutes at 40 pounds of steam.

¶ Such stocks can be preserved against decomposition by the presence of sulphur in the mixings.

¶ Rubber that is vulcanized with ammonium persulphate is quite porous and is therefore of little value.

THE fact that rubber may be vulcanized by means of various organic peroxides in the entire absence of sulphur was shown by the writer as early as 1915. In these experiments, benzoyl peroxide, peracetic or perphtalic acid, and triphenylmethyl peroxide were used. It was also observed that the oxygen in the air will easily oxydize synthetic or purified natural rubber at room temperatures, gradually transforming it into solid and sometimes ebonite-like compounds. These compounds, which very likely have the structure of highly molecular peroxides or oxides, etc., will likewise vulcanize rubber in the absence of sulphur.[2] Our experience indicates that vulcanization of rubber by means of the above mentioned peroxides takes place much more rapidly and easily, i.e., at a lower temperature than is usually employed in sulphur cures. It is astonishing to learn that these peroxides will vulcanize rubber not only in the absence of sulphur but likewise without the admixture of any foreign substances, such as metallic oxides or accelerators of any kind, etc.

As a curiosity it should be mentioned that mixture A made up of 100 gms. of rubber and 30 gms. of benzoyl peroxide[3] vulcanizes completely in one to two minutes at 13 pounds pressure (corresponding to 119° C.) and yielding a soft rubber.

According to Twiss, benzoyl peroxide does actually vulcanize rubber in the absence of sulphur, but the product differs considerably from commercial products cured with sulphur or sulphur chloride.[4] However, *when a sufficient amount of benzoyl peroxide was used,* no essential difference in these products could be detected.

Mixture B of 100 gms. of rubber and 7 gms. of benzoyl peroxide vulcanizes in 25 minutes at 40 pounds pressure. The resulting product is of little value, but it is worth while remarking that the vulcanizate is so soft that, when stretched, it breaks in the jaws of the machine. Therefore its tensile strength fluctuates widely and within a quite unusual range, namely, between 1,430 and 430. The set is 0.08 and the stretch 9.6. After being heated in the usual way (3 hours at 235° F.), it showed the following constants: tensile, 666, 667, and 673 pounds per square inch, set, 0.05 inches, and stretch, 9.0 inches.

[1] Formerly professor of organic chemistry, University of Moscow, Moscow, Russia.

[2] *J. Russ. Phys. Chem. Soc.*, 47, 1467, and 1904 (1915). For reviews of this article see *J. Soc. Chem. Ind.*, 35, pp. 59, 370 (1916). *Chem. Abstracts*, 10, pp. 1946, 3177 (1916); *Caoutchouc & gutta-percha*, 16, p. 9701 (1919); *J. Chem. Soc.*, London, 110-i, p. 178 (1916); INDIA RUBBER WORLD, 54, p. 535 (1916); *Chem. Centralblatt*, 1916, I. 955; *Gummi-Ztg.*, 30, 1102 (1916); *Z. angew. Chem.* 30, II, 48 (1916). Benjamin T. Brooks, "The Chemistry of the Non-Benzoid Hydrocarbons and Their Derivatives," p. 137, New York, 1922.

[3] During the milling process the benzoyl peroxide should be added in comparatively small quantities and be spread over as large a surface of rubber as possible.

[4] *J. Soc. Chem. Ind.*, 782 (1917). Compare, King, *Met. Chem. Eng.*, 15, p. 231 (1916), also Benjamin Brooks, *Ibid*, p. 137.

As a matter of fact the product obtained from compound B differed appreciably from commercial products cured with sulphur. For, regardless of its constants, it is easily milled under usual conditions, loses its form in this process and becomes, like crude unvulcanized rubber, a homogeneous plastic mass. Experience has shown that the minimum quantity of benzoyl peroxide to be used as a vulcanizing agent is 10 per cent (reckoned on the amount of the original rubber).

Mixture C, consisting of 100 gms. of rubber and 10 gms. of benzoyl peroxide, vulcanizes completely in 10-15 minutes at 13 pounds pressure. The product possesses good properties; it is transparent, although somewhat sticky at first. After some time its surface becomes covered with small shining snow-white crystals; at the same time it loses its stickiness. The crystals which separate out may be easily removed by immersing the substance in methyl alcohol for several hours, whereupon it again becomes quite transparent although somewhat sticky. This stickiness disappears in 2 or 3 days, probably owing to traces, undetected by the eye, of the white crystals that separate out and act somewhat in the same manner as talcum.[5] The constants averaged: tensile, 1,540 pounds, set, 0.09 inches, and stretch, 10 inches.

In Moscow some years ago the writer noticed that the rubber products vulcanized by means of various peroxides were gradually and sometimes even rapidly transformed into a very sticky and viscous mass, losing their original shape in the process. This peculiarity is precisely what marks the difference between this product and rubber cured with sulphur and nitrocompounds. Experience has shown that neither aromatic amines nor the oxides and sulphides of metals, nor yet tannic acid can protect against such decomposition of these products. Moreover, they are likely to lessen their resistance to rupture quite considerably. And yet vulcanization of rubber by means of peroxides is most interesting not only from a theoretical but from a practical standpoint, for the procedure may lead to the production of transparent and almost colorless elastic products.

For this reason endeavor was made to find a substance which would protect these vulcanizates from decomposition and thereby stabilize them. Such a product, according to observations, is sulphur. The necessary amount of this substance should be within the limits of 0.2 to 1 per cent or more. In contradistinction to sulphur, selenium and tellurium will not prevent decomposition of rubber vulcanized by means of peroxides.

Mixture D, consisting of 100 gms. of rubber, 10 gms. of benzoyl peroxide, and 1 gm. of sulphur, vulcanizes completely in 15 minutes at 13 pounds pressure. In respect to constants, the resulting product is scarcely different from mixture C, which does not contain any sulphur at all. Its tensile is 1,620 pounds, set 0.09 inches, and stretch 10.5 inches. But, in contradistinction to mixture C this product can be stored for quite a long time without undergoing any change, and it resembles sulphur-cured rubber. Approximately ten days after vulcanization the rhombic modification of sulphur begins to recrystallize cut of it. If, however, the vulcanization of mixture D is prolonged thirty minutes at 13 pounds pressure or 10 minutes at 40 pounds pressure, it results in a stable solution of sulphur in the rubber.

A magnificent result is obtained in the vulcanization of rubber by means of benzoyl peroxide in the presence of a *larger* quantity of sulphur.

Mixture E was made up of 100 gms. of rubber, 10 gms. of peroxide, and 10 gms. of sulphur. It was then vulcanized for 25 minutes at 13 pounds pressure. The constants averaged before heating, tensile 3,025 pounds, stretch 10.5 inches, and set 0.13 inches; after heating (3 hours at 235° F.), tensile 2,605 pounds, stretch 10.7 inches, and set 0.18 inches. This product is white in color and resembles the vulcanizate obtained by means of zinc oxide and sulphur. It is absolutely nonsticky. In our opinion vulcanizate E may be used for such articles as must be free from heavy metals or their oxides, litharge, zinc oxide, magnesia, etc., or in cases where the product used is required to give an unusually good stretch, or when the rubber substances must be relatively softer and more elastic.

Although it is hardly credible, yet it could have been foretold *a priori* that the active agent which vulcanizes the rubber in mixture E is precisely sulphur and that benzoyl peroxide only accelerates the process or reduces its temperature. However, experiments did not corroborate these suppositions. It appeared that benzoyl peroxide in itself does not accelerate ordinary sulphur cures of rubber to any appreciable extent.[6] Thus, efforts were not successful in obtaining a vulcanizate from mixture F, made of 100 gms. rubber, 6 gms. sulphur, and 0.3 to 0.5 gms. of benzoyl peroxide, either at 13 or 40 pounds pressure in 2 hours of vulcanization. On the other hand, rubber containing 10 per cent of sulphur, when vulcanized at 13 pounds pressure, does not show any traces of vulcanization even after 1 hour's heating; whereas mixture C containing 10 per cent benzoyl peroxide vulcanizes completely without sulphur in 10 minutes at the same pressure, and greatly resembles mixture E. Lastly, a characteristic physical property of vulcanizate E points directly to the fact that in this case the active vulcanizing agent is precisely benzoyl peroxide and not sulphur. For, from rubber containing 20 per cent of foreign substances it has not, so far as known, been possible to obtain a vulcanizate with the high stretch displayed by mixture E (10.5) at a tensile of 3,025 pounds. Yet such constants together with high resiliency and softness[7] are characteristic for rubber vulcanized by means of peroxides, irrespective of whether or not the process was conducted in the presence of sulphur or without it.

Vulcanization by benzoyl peroxide cannot be conducted in the presence of metallic oxides, at any rate in the presence of litharge. When stored, these vulcanizates decompose very quickly and are transformed to viscous and sticky masses. Metallic aluminium powder likewise accelerates the decomposition of rubber vulcanized with benzoyl peroxide. It also destroys the action of the sulphur used in the process.

Mixture G was made up of 100 gms. rubber, 10 gms. benzoyl peroxide, 10 gms. sulphur, and 20 gms. aluminium powder. It became sticky in some 15 to 20 days after vulcanization (20 minutes at 13 pounds pressure).

In conclusion the writer desires to mention that he has some samples of rubber which were vulcanized with 10 per cent benzoyl peroxide three years ago, which are very well preserved. These samples are more homogeneous (being free from the brittle and hard layer which usually covers the surface), and they display higher tensile and stretch than samples made of a mixture of 100 gms. rubber, 10 per cent sulphur, and 10 or 15 per cent zinc oxide, which were vulcanized at the same time.

It was also observed that ammonium persulphate will

[5] There is every reason to presume that the nonsticky condition of the surfaces of rubber vulcanized under ordinary conditions with sulphur is likewise due to a secretion of a larger or smaller amount of sulphur dust on the surface, which dust is at times invisible to the eye. Without any doubt traces of this sulphur react on the surface of the vulcanizate in the same way as does talcum.

[6] The writer is satisfied that the vulcanization of rubber by means of benzoyl peroxide not only is *not* accelerated but is actually somewhat retarded by the action of sulphur. In the same way the presence of benzoyl peroxide does not produce any appreciable effect on the speed of vulcanization when the latter is conducted by means of nitrocompounds. For example, a mixture of 100 gms. of rubber, 3 gms. of meta-nitrobenzol and 30 gms. of zinc oxide is completely vulcanized in 60 minutes at 40 pounds pressure, both in the presence and in the absence of 2 gms. benzoyl peroxide.

[7] This constant was measured in the usual way by ascertaining the height of rebound of a metal ball falling from a definite height onto a rubber sheet made of this vulcanizate.

vulcanize rubber yielding, however, a product which is porous, brownish in color, and in general of little value. Apparently, in vulcanization there occurs an evolution of some gas, the nature of which has not yet been established (SO_2 or NH_3). A mixture of 100 gms. rubber and 25 gms. persulphate is completely vulcanized in 2½ hours at 45 pounds pressure. The addition of some calcium oxide to the original mixture will not prevent the evolution of this gas, and ultimately a sticky product of still less value is obtained. The addition of 22 per cent of lamp black will somewhat improve the properties of the vulcanizate. Activated carbon or clay might absorb most of the gas evolved in this process.

Summary

1. Organic peroxides vulcanize rubber not only in the absence of sulphur but likewise without any foreign substances such as metallic oxides or accelerators of any kind.

2. Rubber vulcanized by means of an adequate amount of benzoyl peroxide (10 to 30 per cent) gives a soft rubber product which does not differ in point of physical properties from products cured with sulphur, or rather with sulphur chloride.

3. The process of vulcanizing rubber with benzoyl superoxide is completed in a relatively short time even at a fairly low temperature, sometimes even in two minutes at 119° C., corresponding to 13 pounds pressure.

4. Vulcanization of rubber by means of peroxides may lead to the formation of a soft, transparent and elastic product, which is almost entirely colorless.

5. The products in question vulcanized by means of various peroxides are gradually converted to a very sticky and viscous mass.

6. Sulphur protects the vulcanizates in question from such decomposition or oxidation. However, the products obtained in vulcanization of rubber with organic peroxides in the presence of sulphur are opaque.

7. As distinguished from sulphur, selenium, tellurium, their sulphides, metal oxides (in particular, lead oxide) as well as amines (aniline), tannic acid, and metallic aluminium powder not only do not protect the peroxide vulvanized rubber products from decomposition or oxidation but, on the contrary, they accelerate such processes quite considerably.

8. Benzoyl peroxide is the active vulcanizing agent in the process of heating rubber with a mixture of sulphur and benzoyl peroxide.

9. When rubber is subjected to the action of a mixture of some nitrobenzols and benzoyl peroxides, vulcanization is effected exclusively by the nitrobenzols, and the benzoyl peroxide remains altogether passive.

10. Ammonium persulphate vulcanizes rubber completely, resulting in a porous product which, generally speaking, is of small practical value.

Acknowledgment

The work described in this article was performed in the General Laboratories of the United States Rubber Co., New York, N. Y. I take this opportunity to acknowledge to Ernest Hopkinson and to A. E. Jury my appreciation for the interest which they invariably showed in the work and for the arrangements they made for conducting these researches.

Effect of Wheel Type on Impact Reaction

AN experimental study was carried on by the U. S. Dept. of Agriculture, Bureau of Public Roads, in 1927 and 1928 by James A. Buchanan and E. G. Lapham, and reprinted in *Public Roads*, Vol. 10, No. 5, July, 1929. From this report the following excerpt is taken:

Pneumatic Tires on Rigid Wheels Compared with Cushion Wheels

Since cushion wheels in themselves may contribute some cushioning in addition to that afforded by the tires, the question naturally arises as to how such wheels equipped with solid or cushion tires compare with pneumatic equipment on rigid wheels. The desirability of having information on this point was recognized, and the original program was amplified somewhat to provide the data.

There are two types of pneumatic equipment which are considered standard for the wheel loads used in these tests. These are 40-inch by 8-inch single and 36-inch by 6-inch dual tires. Although for purposes of direct comparison with the other tire equipments used in the program it would have been preferable to test the dual pneumatic tires, this was not possible, because of certain space limitations in the impact-testing machine.

The data for the combination of rigid wheel and pneumatic tire given in the table below were obtained with a 40-inch by 8-inch tire inflated to a pressure of 105 pounds per square inch. The effect of using the single instead of the replacement size dual tires is to increase somewhat the cushioning shown by the pneumatic equipment. The magnitude of this effect may be judged by data obtained in previous tests where it was shown that, on the average, the impact reaction of dual pneumatic 36-inch by 6-inch tires was about 120 per cent of that of a single 40-inch by 8-inch tire, all other test conditions being the same.

It is evident from the data obtained that, after making ample allowance for the added stiffness of replacement size dual tires, the pneumatic tire and rigid wheel equipment provides somewhat greater cushioning (as indicated by lower impact reactions for the same test condition) than does even a new cushion tire on either of the cushion wheels tested.

IMPACT TEST DATA FOR A SINGLE PNEUMATIC TIRE ON A RIGID WHEEL

[Unsprung weight, 1,395 pounds; sprung weight, 1,200 pounds; total weight, 2,595 pounds]

Height of Fall Inches	Displacement		Acceleration Ft./sec.	Computed Force			Measured Force Pounds
	Static Inches	Dynamic Inches		Hub Pounds	Spring Pounds	Total Pounds	
0.812	0.688	1.613	155.5	6,740	—250	7,885	7,500
1.270	.682	1.841	199.7	8,650	—700	9,345	8,600
1.274	.692	1.890	210.1	9,100	—800	9,695	9,600
1.793	.693	2.168	243.9	10,570	—1,300	10,665	11,500

General Indications Summarized

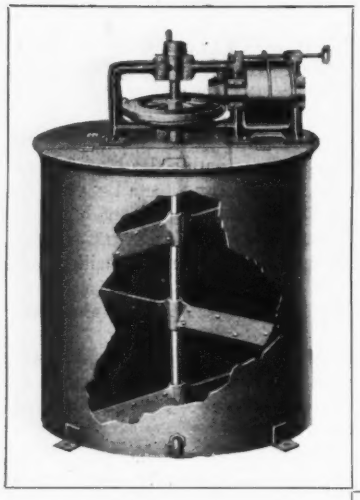
The major indications from this series of tests are as follows:

1. Other conditions being equal, cushioning material incorporated in the supporting structure of a truck wheel reduced its impact reactions. This reduction may be negligible or important, depending upon the construction of the wheel and the tire equipment used on it.

2. The cushioning properties of cushion wheels become more pronounced as the cushioning properties of the tire equipment used on them decrease.

3. The additional weight sometimes necessitated by cushion-wheel design may partially or even entirely offset the advantage gained by the cushioning action of the wheel structure in so far as the impact reaction on the pavement is concerned.

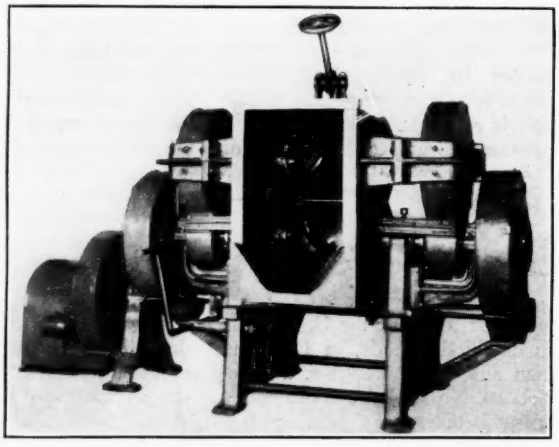
4. For the conditions of these tests, observed tire deflections for impact pressures are practically the same as those observed for static pressures of the same magnitudes.



Patterson Type E mixer equipped with air-tight cover eliminating evaporation of solvents, and fitted with quick opening manhole.

Rubber Cements[1]

S. D. Sutton, F.C.S., A.I.R.T. (Tech.)



Day No. 20 Imperial mixer with working capacity of 40 gallons and equipped with double horizontal arms, is recommended when comparatively small quantities of cement are to be mixed, as in tire building.

THE progress made in rubber cement manufacture has been largely due to the introduction of accelerators of vulcanization, and more recently to the developments made with the direct use of rubber latex. It is not surprising that these two factors which have had such a revolutionary effect in the rubber industry as a whole should affect the cement division in time, but the difficulties encountered at first retarded progress in cement manufacture for some time. In skilled hands excellent results were obtained, but the cements were used in other industries where rubber knowledge was limited, and variable products were the result.

Self-vulcanizing cements were in use before the general adoption of accelerators, vulcanization being effected by the use of sulphur chloride. A pure solution of para rubber in a suitable solvent of approximately 10 per cent rubber content was made, and a measured quantity of 1 per cent solution of sulphur chloride in a solvent was stirred in. The mixed solutions commenced to vulcanize and set to a gel in from a few hours to three days, according to the amount of vulcanizing agent added.

Provided the correct proportions were used, the strength and aging properties of the cement were excellent. This type of cement is still used in certain makes of tire repair kits and for shoe cements, particularly for attaching crepe rubber soles.

In shoe factories this cement is easily handled provided accurate measurements of the vulcanizing fluid are made. But for repair outfits the packing of sulphur chloride solution is difficult as the usual tin containers are attacked. Tight-fitting lead collapsible tubes have proved to be the most satisfactory form of container, the requisite quantity of vulcanizing agent being sent with each tin of cement.

The maximum adhesion of the cement is obtained just before the mixed solution commences to gel, and this means that the prepared cement must be used up before the complete gelling stage, as any left over will become useless.

The introduction of organic accelerators of vulcanization opened up fresh fields for the development of self-vulcanizing cements. At present numerous cements for various purposes are on the market and in use in the largest rubber factories, rapid vulcanization being obtained by the use of organic accelerators.

The choice of accelerator depends entirely upon the class of cement to be manufactured. For example, a tire cement for repairing by hot vulcanization might contain diphenyl guanidine or tuads. The latter is preferred on account of its useful property of not becoming active until above the boiling point of water. Very rapid vulcanization can be obtained in the cold by the use of such ultra accelerators as tetra methyl thiuram disulphide and piperidyl dithiocarbamate of piperidine.

Still more active results are to be obtained by the two-accelerator effect, and cements are produced that will vulcanize completely in room temperatures in two or three hours. Although useful for certain purposes, these ultra rapid vulcanizing cements are limited to a small commercial application as only very small quantities can be mixed if wastage

[1]*Continued from* India Rubber World, Oct. 1, 1929, p. 58.

TABLE 1

Self-Vulcanizing Cements

Basis Mix	Grams	Grade of Rubber	Gelling Time Hours	Adhesion Minutes
Rubber	100	Evaporated latex	24	190
Zinc oxide	5	Smoked sheet	30	195
Accelerator	1	Pale crepe (blanket)	32	175
Sulphur	2	Pale crepe (lace)	33	160
Benzene	1,000	Para (washed)	72	193

TABLE 2

Non-Vulcanizing Cements

Basis Mix	Grams	Grade of Rubber	Adhesion Minutes
Rubber	100	Evaporated latex	184
Benzene	1,000	Smoked sheet	175
		Pale crepe (blanket)	165
		Pale crepe (lace)	160
		Para (washed)	170

is to be avoided. The cement that will vulcanize in 24 to 36 hours at room temperatures seems to be in most popular demand as a supply can be mixed and used up during one day.

The preparation of these cements entails some little care especially if the accelerator is added to the rubber during mastication and mixing on the mill. Mastication is a very important factor as the degree to which this operation is carried out determines to a great extent the strength of the cement, its viscosity, and the gelling period. If, therefore, a uniform product is to be maintained, mastication must be carried out for a definite period at a fixed nip of the rolls, and a constant temperature. Five minutes over mastication at a higher temperature than the correct time will retard vulcanization for many hours if an ultra accelerator is used.

As a general rule, the mastication and mixing period should be as short as possible with the rolls of the mill kept at a low temperature. By this method the rubber is milled sufficiently to obtain a good concentration in solvent while its strength or nerve has not been impaired. Cements used by the garment industries which are not self-vulcanizing must deposit a "lifeless" rubber, and, therefore, in their preparation prolonged mastication is essential.

Zinc oxide which is incorporated in most self-vulcanizing cements acts as an activator to the organic accelerator present. Quantities up to 10 per cent on the rubber are sometimes used, but the minimum amount is advised on account of the toughening and drying effect which tends to retard adhesion. In this direction Kadox colloidal zinc oxide has proved extremely useful as in this finely divided state only a very small amount is required to activate the accelerator to its fullest effect.

As to whether the sulphur or accelerator be added to the base mix is a matter of opinion. Yet it would appear to be advantageous to add the accelerator at this stage and stir in the required quantity of sulphur to the cement before actual use, as less harm is likely to result from excess of sulphur should a mistake occur; also certain accelerators are very unpleasant to handle alone.

The grade of crude rubber used has an important bearing on the resulting cement and this point is particularly evident with self-vulcanizing cements. Tables 1 and 2 show the results obtained by preparing various rubbers for cements under similar conditions.

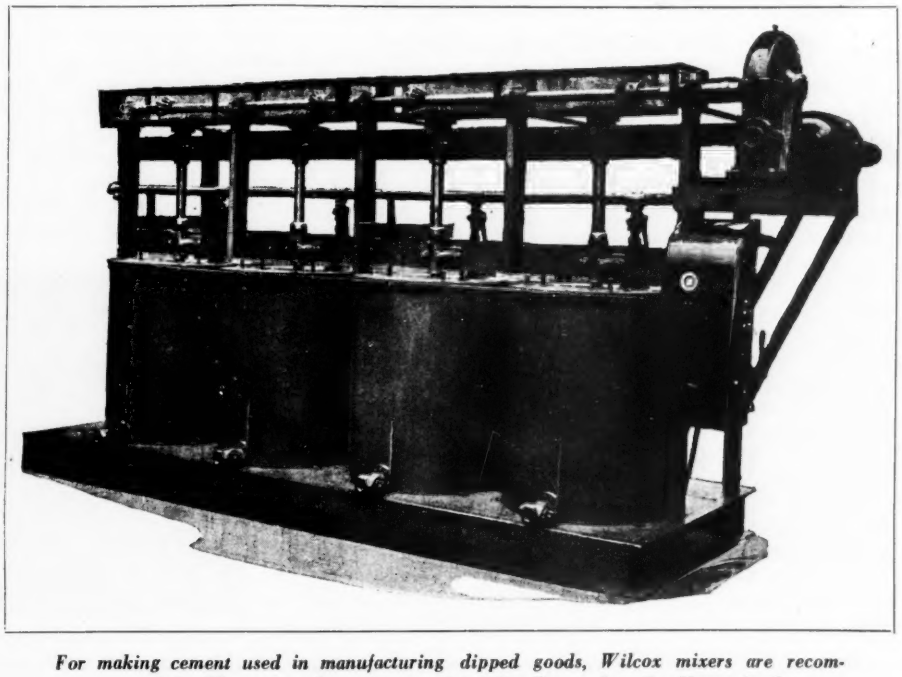
Mastication and mixing were carried out in each mix for 10 minutes with a fixed nip and temperature. The accelerator piperidyl dithiocarbamate of piperidine was stirred in, and the solutions left to gel at room temperature 60° F. The adhesion tests were made by joining two pieces of vulcanized rubber with cement and stripping under a fixed load, note being made of the time taken to strip a certain distance. All the test pieces that were joined had passed the gelling time before the tests were made. The adhesion results in the tables show the comparative stripping times. It will be noted that the self-vulcanizing cements give better all-round adhesion figures than those made with pure unvulcanized rubber.

It will be seen that the period of vulcanization varies considerably according to the grade of rubber used, and these results are reflected in the strength of the cement. Evaporated latex rubber gixes extraordinary good results in pure rubber solutions, and even a small quantity will enhance the strength of a cement where crepe has been entirely used.

The direct use of rubber latex as a cement is finding increasing favor in industry. The disadvantages of slow drying and water absorption are overlooked, as the cement is fairly cheap, economical in use, and has good adhesive properties if the materials to be joined are slightly porous, such as leather.

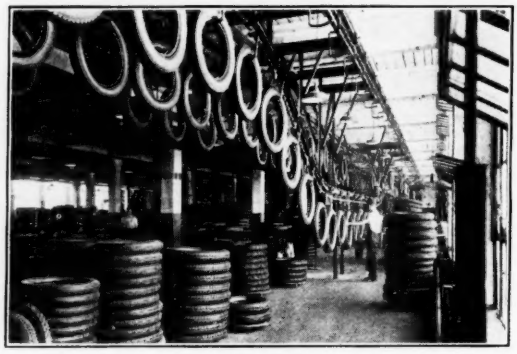
Progress in the preparation of latex on the estate has led to the production of a concentrated product known as Revertex. This material contains only 25 per cent moisture as against 60-70 per cent in ordinary latex. Large quantities of this concentrated latex are being used in cements of various types especially in the boot and shoe industry.

Methods for the application of rubber cements in industry and the special manufacturing processes involved will be dealt with in a forthcoming article.



For making cement used in manufacturing dipped goods, Wilcox mixers are recommended. Illustration shows battery of 4, 100-gallon tanks, all self-contained.

Conveying in Tire and Rubber Factories[1]



General View of a Chain Trolley Conveyer Handling Tires

KEEN competition in any industry has usually proved beneficial, for it has forced the adoption of the most modern manufacturing processes and methods. It was this competition which brought about serious consideration of production time and costs in the tire and rubber plants. It caused manufacturers to put the stop-watch on production—to figure the maximum daily capacity of each man and piece of equipment.

Before outlining some of the more important conveyer applications in the tire industry, it may be worth while to go over some of the points in favor of installing conveyer equipment.

Live Roller Units Handling Tires in Finishing and Inspection Departments

Savings in labor can be summed up briefly by comparison of the number of employes per tire produced. It is estimated that in 1919 about one person was employed for each tire produced. While today, the average is about six tires per day per person employed. This great increase in production is directly due to mechanical handling and improved methods combined.

Saving in floor space is one of the great advantages incident to conveyer installations, for in most cases the materials can be carried overhead and in out-of-the-way places. This permits closer spacing and a greater number of machines on the floor. The cry for more production per foot of floor space demands elimination of all unnecessary aisles and temporary storage space so necessary without conveyers. The advantages of utilizing all floor space has led to increased use of overhead conveyers.

Pace setting is inherent in conveyer systems since it causes the workmen to work in unison at a predetermined rate at which they can work efficiently throughout the day.

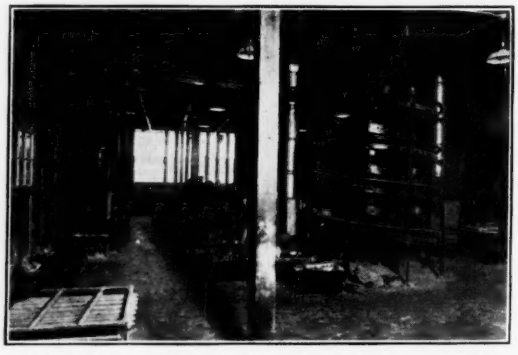
Reduced inventories are common in plants whose output is so well regulated by its conveyers. The operations on the materials and handling of them becomes almost automatic. The inventory of work in process is reduced and requires less stored materials. The materials are in a mobile state, properly separated and accessible at all times. This eliminates the use of floor space for storage. Conveyers have the effect of adding space by saving floor space.

The type of labor required in connection with conveyer systems is different. It is not necessary that operatives be robust physically. The conveyers carry the burden of industry and the giant physically is not so necessary as formerly. By means of automatic deflecting and transferring of materials much is accomplished without any human assistance and the day of robust men for handling heavy materials is passing. This is particularly true of the curing room.

For savings in compensation it can be said that conveyers have greatly reduced the number of accidents. The chances of injury to operators is reduced to the minimum, and the thousands of tons carried daily without accident gives testimony to this fact.

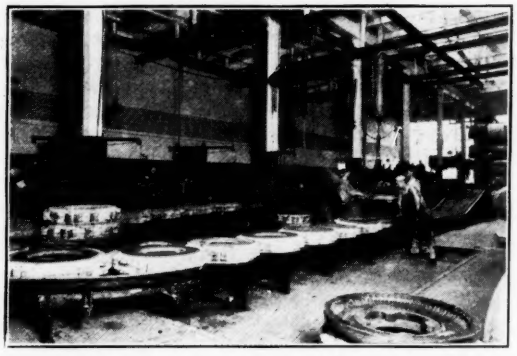
Thus far the handling of crude rubber in bales from cars to storage has been in most plants by hand and electric trucks. A suggested form of the fixed type of conveyer is the trolley with specially designed clamps to pick up the bale after it has been uncrated at the car-door and to convey it into the storage area. This same conveyer can be continued for carrying the bales from storage to the slabbing machines and then on to the compound room.

One of the next material movements is that of conveying filled compound pans from the compound room to the mixers and returning the empty pans. These conveyer units usually consist of roller and belt conveyers for horizontal movement, inclined pusher bar or vertical electric hoist elevators for elevating the pans, and roller spirals or declined straight chutes for lowering the empty pans.



Filled Compound Pans Are Elevated on Automatic Airhoist at Left and Empty Pans Come Down on Roller Spiral at Right

[1] By F. E. Moore, president, Mathews Conveyer Co., Elwood City, Pa. Read at the Akron meeting of the American Society of Mechanical Engineers, held in Akron, O., Oct. 21-23, 1929.



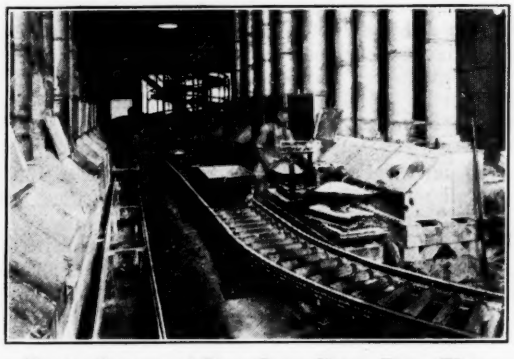
Tire Mold Loop Showing Breaking and Refilling Point, Also Power Booster

The mixed compound, on being discharged from the mixer, falls onto an inclined beaded pallet conveyer or inclined belt and is conveyed to the refiner or sheeting rolls for additional mixing.

In the manufacture of tires there are three distinct processes: the preparation of materials, the building of the tires, and the curing. The individual handling of materials is considerable and complicated at times. For instance, much of the material coming from the material preparation division department is perishable, at least to the extent that close control must govern the amount to be prepared daily. Second, there is a wide variety of sizes and shapes in the material delivered to different points; and third, in order to conserve space and reduce rehandling, there must be effective coordination at transfer points.

Designing a conveyer system of sufficient flexibility to meet these requirements, which will be simple and effective, is not an easy matter. A system usually consists of a series of conveyers of different types, overhead chain, trolley, steel apron, belt, roller, roller conveyer spirals, and sheet metal spirals. Automatic tripping and transferring of materials is accomplished in many instances in a way that excels in mechanical ingenuity and workmanship. Nearly every application of conveyers has its own peculiar problem to be worked out. Here lies the value of the conveyer manufacturer's experience, for nearly always a comparison can be made to a previous problem that has been solved by him.

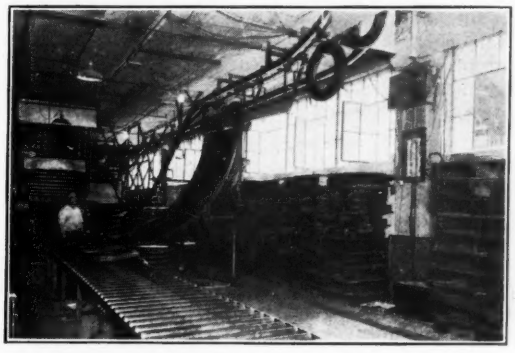
In the tire factory the volume of material handled by the material preparation department exceeds that of any other in the number and variety of pieces. Second is the building departments, and third, is the curing room. However, the curing room handles in poundage of bags, rings, and molds, which are required to cure each tire, an amount in some instances reaching thousands of tons daily.



Fmpty Compound Pans Come Down From Floor Above on Roller Spiral in Background. Filled Fans Travel on Roller Conveyer to Vertical Hoist

The work done in the material preparation department varies from impregnating fabric, tread making, and bead building, to delivering to the tire building divisions the materials which are eventually built into the green tire. Such delivery is accomplished by the service conveyer, which is a continuous overhead chain trolley conveyer. Its course sometimes is varied and its hooks or hangers are of several different types to suit the material carried. This conveyer receives from the racks, the tables, or the machines, located in or near the central stock room, the particular parts it is to carry to the tire builders. Of course the loading of the conveyer is done by hand as the parts are built.

The green tires receive the air bags at first at the bag inserting machines and are then placed into the molds. Now comes the heavy work of the tire factory. Conveyers have here proven their capacity for handling tonnage with an exactness that makes them the greatest labor, time, and space savers of any other equipment. There are several different types of conveyers used for handling tires in molds both into and out of the heaters. Perhaps the most common type today is the gravity roller conveyer loop which has a pallet conveyer for boosting the molds up to the required elevation after they receive the green tire. Thus the molds travel smoothly and at even speed to the vulcanizer in the shortest possible space of time consistent with loading of the vulcanizers.



Automatic Deflection From Overhead Chain Trolley to Live Roller Unit

In the present day of quick curing stocks, this is an important feature. With this type of conveyer no charge for power is made except for the booster which requires an average of 2 h.p. Gravity furnishes the rest without charge. The average 7 to 10 vulcanizer unit can be equipped with such a conveying system in a few days.

From the tire pit to the warehouse is perhaps the route that brings into play the greatest variety of conveyers. Conveying tires singly through the operations of trimming, painting, and wrapping requires that they be carried closely together at such speed and in such position as to make them easily accessible for these different operations. The trolley or overhead chain conveyer fills this need. The speeds for handling different sizes efficiently is necessarily different and with a variable speed drive the speed of this type of conveyer can be adjusted in a moment's time without stopping the conveyer.

To carry the tires from the wrappers, belt and roller conveyers are largely used, having in conjunction various types of chutes and sometimes spirals. In order to make roller conveyer lines easily portable, the sections are mounted on castor jacks, and universal couplings are used at each end of the sections, making them readily attachable or detachable. The roller conveyer is made in a variety of types, each having its special application consistent with the sizes of tires or commodity to be conveyed.

The variety of articles even from a tire factory are so numerous that in the foregoing no attempt has been made to discuss in detail the conveyer equipment required to carry any one particular article. On the average 100 sizes of tires are handled, some of which contain tubes and flaps, some unwrapped, and some wrapped.

Then the handling of tubes is almost as important as that of tires. All along the manufacturing line from the time the tube leaves the vulcanizer it moves on conveyers. The finished tube is packed in its individual carton alongside a belt conveyer, placed in shipping cartons, and the latter carried on roller conveyers or belts to shipping room or warehouse.

Are conveyers a paying proposition in tire and rubber plants? The answer is that additional installations are going into these plants every day as the result of checking and rechecking costs. A system that will pay for itself in approximately three years is a worth-while investment.

Summing up, it is but fair to say that today sixty-five major industries are using conveyers in varying degrees, all of which are justifying their existence. In former years the average plant executive would pick out some isolated problem and try out conveyers on it, using that as sort of an experimental laboratory to check savings. Today he is starting his thinking on the handling problem in the receiving department and working out the complete production and warehousing and distribution processes on conveyers.

The tire and rubber industry is one that lends itself readily to the efficient use of such labor saving and pace setting equipment. The leaders of that industry are awake to the savings that can be and are being made through the use of conveyers.

Latex Molded Shoes, Gloves, and Toys

AN unique process has been invented whereby rubber articles of irregular shape may be made by automatic machinery without recourse to the usual procedures of compounding dry rubber, forming and vulcanizing the articles. The process serves as a rapid method of manufacture of rubber goods having great flexibility and water resistance, such as shoes in particular.

Briefly stated, the invention consists in coating a form with a rubber dispersion, effecting coagulation of the adhering rubber dispersion, washing the coagulated rubber, and subsequently drying it on the form. In carrying out the process, the form, which may be of glass, metal, earthenware, fibers, or fabric, is coated with a rubber dispersion by dipping, spraying, painting, etc., and then treated with a coagulant and washed.

In applying the invention[1] to the manufacture of an overshoe, a form covered with woven or knitted fabric, or with paper pulp if a particularly inexpensive overshoe is to be made, is dipped into a latex composition such as the following:

	Parts by Weight
Rubber as latex (containing 3 parts by wt. of sulphur, 1 part by wt. of zinc oxide, ½ part by wt. of glue, 1 part by wt. of sodium dithiobenzoate)	100
Kaolin	100
Sulphur	3
Zinc dimethylamine dithiocarbamate	1
Glue	1
Zinc oxide	1

The form is then withdrawn and immersed in a coagulating bath consisting of equal parts of glacial acetic acid and water. Without delay, the coated form is dipped into a washing bath of water which is preferably kept nearly neutral by continual or complete replacement with fresh water. Some of the coagulant is allowed to remain on the coagulated layer to hasten coagulation of the next layer of rubber. The last is dipped again into the latex, then into the coagulant, and then into the wash water. Four such dippings in the latex, followed by the coagulation and washing treatments, will give a dry rubber coating of approximately .04-inch. After the final coagulation, the coated last is washed in an alkaline water to neutralize any remaining coagulant, and is then dried and the rubber shoe removed.

The invention is suitable for the manufacture of gloves, either consisting entirely of rubber or having a fabric portion, footwear, tubing, irregularly shaped objects, such as dolls, toys, and other rubber articles. It is adaptable to those objects which are prepared upon a form which may be an irregularly shaped rigid body or which may be a fabric.

The process may be utilized to great advantage in the manufacture of rubberized materials such as fabrics, belting, ropes, cordage, etc. Thus prepared, these goods have a high degree of flexibility and are free from the harshness and stiffness frequently met with when rubber coatings are deposited by evaporation methods.

[1] U. S. Patent No. 1,719,633, July 2, 1929.

Officers of Rubber Section, N. S. C.

The following are the new officers of the Rubber Section, National Safety Council:

General chairman, J. T. Kidney, The Goodyear Tire & Rubber Co., Arkon, O.; vice chairman, C. L. Hungerford, Firestone Tire & Rubber Co., Akron, O.; secretary, S. Mansfield, The Goodyear Tire & Rubber Co.; chairman poster committee, Roland Kaskell, United States Rubber Co., New York, N. Y.; chairman health committee, L. J. D. Healy, Federal Div., The Fisk Rubber Co., Cudahy, Wis.; chairman program committee, A. D. Kunze, The Rubber Association of America, New York, N. Y.; chairman membership committee, A. P. Regal, The Philadelphia Rubber Works Co., Akron, O.; chairman publicity committee, P. B. Martens, The Industrial Commission of Ohio, Copley, O.; chairman statistics committee, Howard W. Low, The Miller Rubber Co., Akron, O.; chairman engineering committee, S. Mitchella, Republic Rubber Co., Youngstown, O.; chairman, committee on slides and safety kinks, J. E. Lynch, The Fisk Rubber Co., Chicopee Falls, Mass.; news-letter editor, J. R. Hanson, United States Rubber Co., Detroit, Mich.

Advisory Committee: W. L. Schneider, The B. F. Goodrich Co., Akron, O.; M. A. Quirk, United States Rubber Co., Detroit; R. C. Salisbury, Federal Div., The Fisk Rubber Co.; E. W. Beck, United States Rubber Co., New York.

September Tire Statistics

Tire manufacturers in the United States produced 4,757,600 pneumatic casings during September according to estimates issued by the Rubber Manufacturers Association. Total production of inner tubes is estimated at 5,535,819 and total production of solid and cushion tires at 36,936 for the month. Total shipments during September are estimated as follows: pneumatic casings, all classes, 5,998,363; inner tubes, 6,249,680; solid and cushion tires, 48,167.

Inventories as of September 30 are estimated as 12,875,189 for all pneumatic casings, 13,424,391 for inner tubes, and 147,461 for solid and cushion tires.

The tire industry is estimated to have consumed a total of 53,308,392 pounds of crude rubber and 18,198,733 pounds of cotton fabric during September in the manufacture of all types of pneumatic casings, inner tubes, and solid and cushion tires.

The Association's estimates are based on reports furnished by manufacturers who produce approximately 75 per cent of the total for the United States.

Airplane Tires and Wheels

H. F. SCHIPPEL[1]

ALTHOUGH the subject should more properly be called Airplane Tires, yet one cannot discuss tire equipment and performance without including the wheel, and even the shock absorber, for these three principal parts of the airplane landing gear are closely interrelated.

It is the intent of this paper to discuss some of the accepted practices in connection with the application of pneumatic tires to airplanes, and add a little to the sum-total of our knowledge covering the performance of airplane tires.

Tire Mounting Conditions

The straight-side tire has now without question been accepted as the standard for the industry, although the change-over from clincher to straight-side tires has not yet been completely accomplished. The rim equipment is of the drop-center type, which has been selected on account of its strength and lightness, having eliminated the necessity of a felloe band. A typical tire mounting is shown in cross-section in Figure 1.

The bead of the tire registers on the rim ledge, which has a 5° slope, and makes a close fit, so that the inner tube can come in direct contact without danger of injury. The necessity of a flap is therefore eliminated. Particular attention, however, is paid to the design of the tire bead so that it does not overhang the side of the well as shown in Figure 2. This condition may possibly arise when oversize tires, or extra-ply tires are used, owing to the greater bead width, but usually there is no overhang. Whenever such overhanging exists, tube chafing is liable to occur, and this may eventually lead to a leaky tube and a flat tire. In cases where bead overhang is unavoidable, the tire may be furnished with bead flaps, as shown in Figure 3. These flaps are not entirely desirable, however, because they interfere with mounting of the tire.

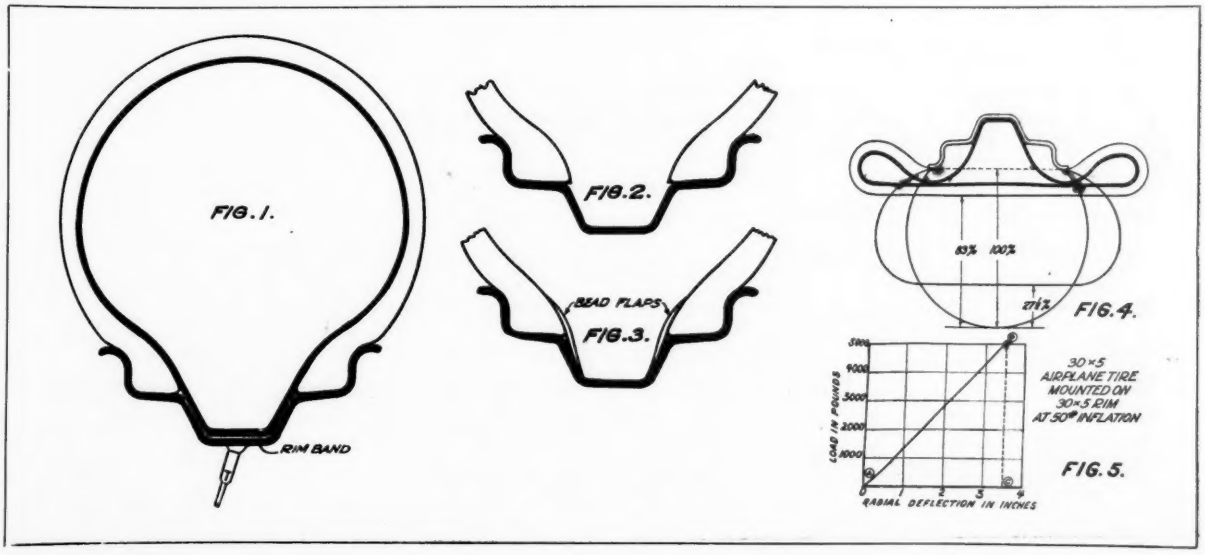
Airplane wheels are of the wire spoke and the disk types. In the former type, the spokes are laced into the drop-center rim, the heads passing through the rim either on the bead ledge, or in the well, or both, and sometimes on the side of the well. The ends of the spokes and nipples may be ragged, and it is important that the tube be kept from contact with them. For this purpose a rim band is provided, as shown in Figure 1, which successfully covers the spokes on the bottom of the well, but not on the side of the well unless the rim band is made unusually wide, in which case it cannot with certainty be maintained in correct position because of possible disturbance when mounting the tire. An alternative solution lies in the use of bead flaps, but this practice, as mentioned before, is not wholly desirable.

Rim bands are not required on disk wheels, there being no danger in allowing the tube to make complete contact with the rim. It has been the practice of airplane tire manufacturers to furnish rim bands with each tire, whether sold for original equipment or replacement, but by general agreement among the tire and wheel manufacturers, effective October 1, 1929, these rim bands will be furnished by the wheel manufacturers when necessary. A further advantage of this change in practice occurs in the case of oversizing, the rim band according to old practice being too large for the undersize rim.

Tire Load Ratings

The method of rating airplane tires for static load capacity is very similar to that used for passenger car tires. The rating is made on a basis of radial deflection, calculated by the method shown in the U. S. Army Specifications. This method rates tires according to a definite radial deflection taken as a percentage of the cross-sectional height of the tire measured from the point of extreme overall diameter to the top of the rim flange. The present line of tires is rated on the basis of a radial deflection equal to 27½ per cent of this distance. On this basis the tire cannot deflect 100 per cent, because twice the thickness of tire and tube intervenes between the rim flange and the ground at complete collapse of the tire. Figure 4 shows this clearly. In the case of the 30 by 5-inch tire the maximum possible deflec-

[1] Design engineer, The B. F. Goodrich Co., Akron, O. Paper read at the aeronautics meeting of the American Society of Mechanical Engineers, held in Akron, Oct. 22, 1929.



tion is about 83 per cent. Figure 5 shows a typical loading curve for an airplane tire, loaded up to the extreme deflection noted above, or collapse point. It will be noted that this tire, which is rated at 1,600 pounds static load, has a maximum cushioned load capacity of 5,100 pounds. This indicates that the ratio of maximum static load rating is 5,100 ÷ 1,600 = 3.2. But the maximum design load for the plane which takes the 30 by 5 tire is about 6 times 1,600 pounds or 9,600 pounds.

It is, therefore, quite obvious that under the conditions of maximum allowed impact of the plane upon the ground the tire is not only completely flattened but is pinched between the rim and the ground. This is not a highly desirable condition and is tolerated only because the tire apparently has the ability to withstand this punishment or because such a severe landing occurs very infrequently. The ideal condition for the tire would be to have its collapsing load equal to the static load multiplied by the load factor, but this would reduce the static rating of the 30 by 5 tire, for example, from 1,600 pounds to 5,100/6 = 850 pounds, or approximately half its present rating. An alternative and equally undesirable method of equalizing this condition would be to increase the collapsing load to the required value by increasing the inflation pressure to about 100 pounds.

There seems to be an impression that the drop-center rim increases the cushioning properties of a tire because of the extra amount of air volume in the drop-center portion of the rim. This impression probably arises from the fact that the capacity of a tire is often spoken of as proportional to its air volume. Although this is true in an approximate way, yet it is the active air space only that is of consequence in relation to tire cushioning, because it is only that air space that substantially affects the loading characteristics of the tire. Figures 6 and 7 show in a diagrammatic way the significance of this statement. Figure 6 shows the relation between load and radial deflection for a 30 by 5 airplane tire mounted on the regular drop-center rim and on a hypothetical flat-base rim having the same dimensions as the drop-center rim except for the absence of the well portion. The latter curve was obtained by calculations on the following basis: When a tire is loaded, the portion of the tire in contact with the ground suffers a decrease in internal volume, and this produces an increase in inflation pressure. For example, a 30 by 5-inch tire, mounted on a 5-inch drop-center rim and inflated to 50 pounds shows a pressure rise of 5 pounds when loaded to 5,100 pounds. The curve of pressure rise is shown in Figure 7. The drop-center portion of the rim represents only 5 per cent of the total volume of air in the inner tube, and hence the pressure rise in the 30 by 5 tire, when mounted on a hypothetical flat-base rim, would be 5¼ pounds, which would increase the ultimate load-carrying capacity of the tire by approximately 25 pounds, which is almost insignificant.

However, the results serve to indicate that the increased air volume of the tire on the drop-center rim decreases rather than increases the load-carrying capacity through the effect that air volume has upon the pressure rise under load. In order to show the full extent to which we can increase load-carrying capacity by decrease in air volume, a test was made with the air entirely replaced by water. The water being incompressible, the cushioning property of the tire was entirely dependent upon the elasticity of the cords in the tire carcass. The pressure rose from 50 pounds at no load to 96 pounds at 5,100 pounds load, but at full radial deflection the tire was capable of supporting 10,000 pounds, at which load the inflation pressure would have been 150 pounds.

The load capacity of a tire is also affected to a small extent by the width of the rim on which the tire is mounted. Figure 6 shows the loading curves for the 30 by 5 tire on the 4 and 5-inch airplane rims.

Energy Capacity and Absorption

We will start out with the simple and approximate method of measuring the energy capacity of a tire under radial deflection. This method is the static test in which the stationary tire is loaded against a flat plate in a loading machine and deflected until the tire is compressed between the rim and the contact plate. The curve in Figure 5, for a 30 by 5-inch tire, was obtained by this method, the energy stored being represented by the area ABC lying under the loading curve. This energy is 8,950 inch-pounds, and represents the ability of the tire to absorb energy in a vertical direction when the airplane makes a landing. It should more correctly be stated, however, that this only approximately represents the vertical energy capacity, because the curve was obtained by a loading test that was comparatively slow compared to the rate of deflection under service conditions.

It is quite possible that the energy capacity may be greater under the condition of rapid loading. Unfortunately, the necessary equipment was not available to make the rapid loading test. A careful study, though, of the conditions under which a tire is deflected against the ground in actual

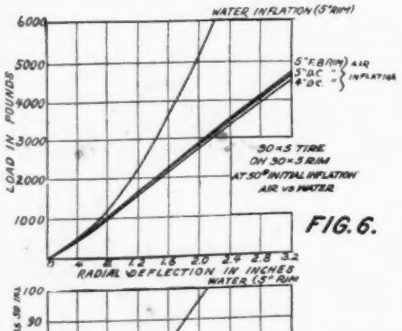


FIG. 6.

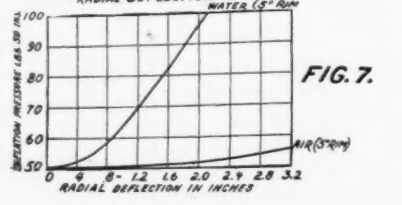


FIG. 7.

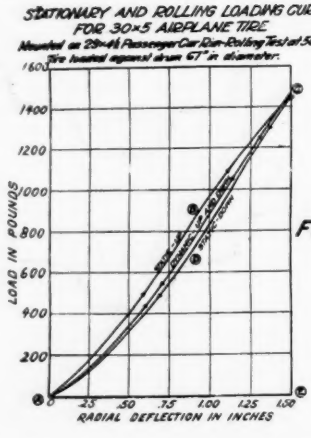


FIG. 8.

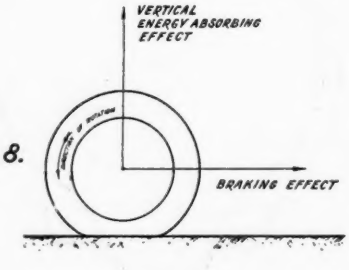


FIG. 9.

service will disclose the fact that even this rapid loading test would not give the true figures. In actual service the tire is not stationary but rolls along the ground at a rapid rate, and the length of tire carcass loaded is not represented by the small section in instantaneous contact with the ground, but by the length equal to the distance traversed by the plane over the ground during the interval of contact.

We have simulated this condition in the laboratory by loading the tire against a large wheel revolving at a speed representative of the initial landing speed of an airplane, that is, 50 miles per hour. On account of the curvature of the drum it was necessary to obtain a new static loading curve for comparison with the dynamic curve. Figure 8 shows the results obtained. The curve ABC represents the static test results for increasing load and CDA the curve for decreasing load, and the area ABCDA represents the static hysteresis loss for the complete loading cycle. It will be noted that the tire was not loaded to complete collapse, because at a speed of 50 m.p.h. the temperature rise due to internal friction in the tire during the length of time required to make the test, would have affected the inflation pressure and also the results.

The static curves show that the amount of energy stored in the tire upon increasing load was 1,047 inch-pounds, and the amount returned during decreasing load was 919 inch-pounds. The area of the hysteresis loop is therefore 128 inch-pounds, and so we may say that the efficiency of the tire statically as an energy dissipator is 12.2 per cent. Static loading tests on a Reihle machine have shown this efficiency to be only 6 per cent; so it is feared that the above static loading test may be in error on account of friction of the carriage on which the tire was mounted. However, the results are at least of qualitative interest. Figure 8 also shows the results of the dynamic loading test at 50 m.p.h. The curve falls inside the static hysteresis loop and it shows no hysteresis loop, since the curves of increasing and decreasing loads coincide. It may therefore be concluded that the efficiency of the rolling tire as an energy dissipator in a vertical direction is zero.

But since, during the interval of the single high-speed impact of the plane on the ground, the tire may have traveled over 100 feet along its outside periphery, a considerable amount of energy must necessarily have been absorbed owing to the hysteresis of the tire carcass. If, then, there is all this absorption of energy, why does the tire show no hysteresis loop on the dynamic loading curve? The answer is that it is necessary for us to distinguish between effective braking action and "shock-absorbing" action in a tire, or horizontal and vertical components of energy absorption. See Figure 9. In other words, the energy loss in a tire when rolling along the ground appears as a net horizontal, or braking, action, and not vertical or "shock-absorbing" action.

It is unfortunate that my search for the good qualities in airplane tires should have exposed such gross incompetence of the tire in the vertical direction! But so long as this creates a demand for rubber shock absorbers, I do not condemn the tire for failure to support the rubber industry.

Figure 10 throws light on this particular performance of the tire from another angle. Here are presented curves showing the apparent increase in vertical reaction of a tire due to a rotative speed. The increase is really a centrifugal effect and could be expressed in terms of equivalent inflation pressure increase, if so desired. The upper curve shows that if we start with a load of 1,600 pounds with the tire at rest, this load increases to 1,740 pounds at 50 m.p.h., or 8.6 per cent increase. This centrifugal effect increases the vertical energy capacity of a tire, and this increase would be very apparent if we were to plot the dynamic loading curve in Figure 8 with the point of zero load set back of the zero for radial deflection by 3/32-inch, which is the increase in the tire height at 50 m.p.h.

Air Drag

On account of the increasing use of anti-skid tires on airplane landing wheels, it is important that their comparative air drag values become definitely known. It is also important that information be made available on other factors in connection with tire and wheel design, such as the efficiency of streamlining of the wheels and tires and the effect of toe-in or out-of-alinement of the plane of the tire and wheel with respect to the line of flight.

With these objectives in view, The B. F. Goodrich Co., under the personal direction of Prof. Alexander Klemin, conducted tests in the 9-foot wind tunnel at the Daniel Guggenheim School of Aeronautics of New York University, on various combinations of tires and wheels as follows:

1. 14 by 3-inch smooth airplane tire on 14 by 3-inch wheel.
2. 20 by 4-inch smooth on 18 by 3-inch wheel.
3. 20 by 4-inch safety tread on 18 by 3-inch wheel.
4. 30 by 5-inch smooth streamline tire on 28 by 4-inch wheel.
5. Same as 4, but toe-in 2° 2′ (.35 inch).
6. Same as 4, but toe-in 4° 4′ (.70 inch).
7. Same as 4, but toe-in 6° 6′ (1.05 inch).
8. 30 by 5-inch smooth tire on 28 by 4-inch wheel.
9. Same as 8, but toe-in 2° 2′ (.35 inch).
10. Same as 8, but toe-in 4° 4′ (.70 inch).
11. Same as 8, but toe-in 6° 6′ (1.05 inch).
12. 30 by 5-inch safety tread on 28 by 4-inch wheel.
13. 32 by 6-inch safety tread on 28 by 4-inch wheel.
14. 32 by 6-inch smooth streamline tire on 32 by 6-inch wheel.
15. 32 by 6-inch smooth on 32 by 6-inch wheel.
16. 32 by 6-inch safety tread on 32 by 6-inch wheel.
17. 6.00-20 (32 by 6.00) Silvertown passenger car balloon tire on 32 by 6-inch wheel.
18. 32 by 6-inch smooth airplane tire on 32 by 6-inch wheel without streamline disks on wheel.
19. 36 by 8-inch smooth on 36 by 8-inch wheel.
20. 40 by 10-inch safety tread on 36 by 8-inch wheel.

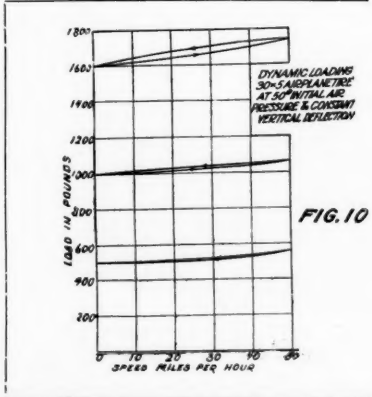


FIG. 10

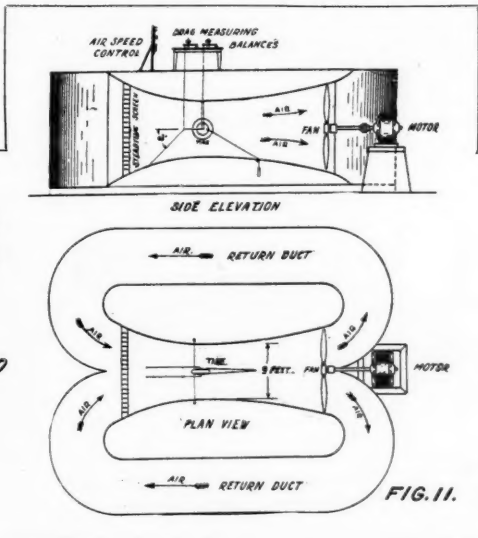


FIG. 11.

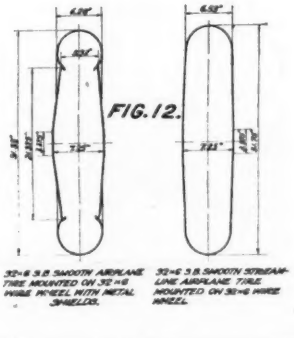
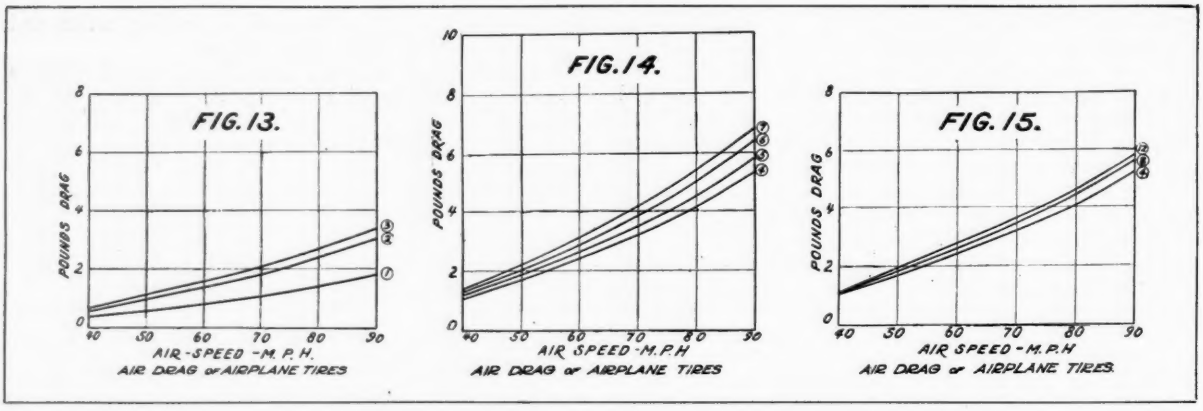


FIG. 12.



Each combination was tested at 40, 50, 60, 70, 80, and 90 miles per hour, and the drag in pounds calculated for each air speed, as well as the drag coefficients based on actual cross-sectional area through the center of the axle and on the projected area which is slightly greater. Figure 11 shows diagrammatic plan and elevation views of the wind tunnel.

The wheels used were of the wire spoke type, and sheet metal fairings were used except where noted above. Detailed results are shown in the curve sheets, Figures 13 to 18, inclusive, in which the numbers shown refer to the tests listed above. The drag given is the net drag on tire and wheel, correction being made for the drag on the axle and connecting wires.

In order to calculate drag coefficients, the projected areas for each tire must be computed similar to the method shown on the accompanying drawing, Figure 12, for the 32 by 6-inch tire. The actual areas, as viewed in an aerodynamic sense, comprise the complete projection of each unit, and these areas are slightly larger than the cross-sectional areas. The method of calculating the drag coefficient is as follows:

$$\text{Drag coefficient} = \frac{\text{Drag in pounds}}{\text{Projected area in sq. ft. x m.p.h.}^2}$$

The drag coefficient therefore numerically equals the drag per square foot of projected area for an air speed of one mile per hour.

In the case of streamlined wheels the projected area was computed disregarding the increase in area due to the shields, as this makes the comparison of these wheels with ordinary ones clearer. No allowance for increase in area was made in the cases of toe-in.

Discussion of Results

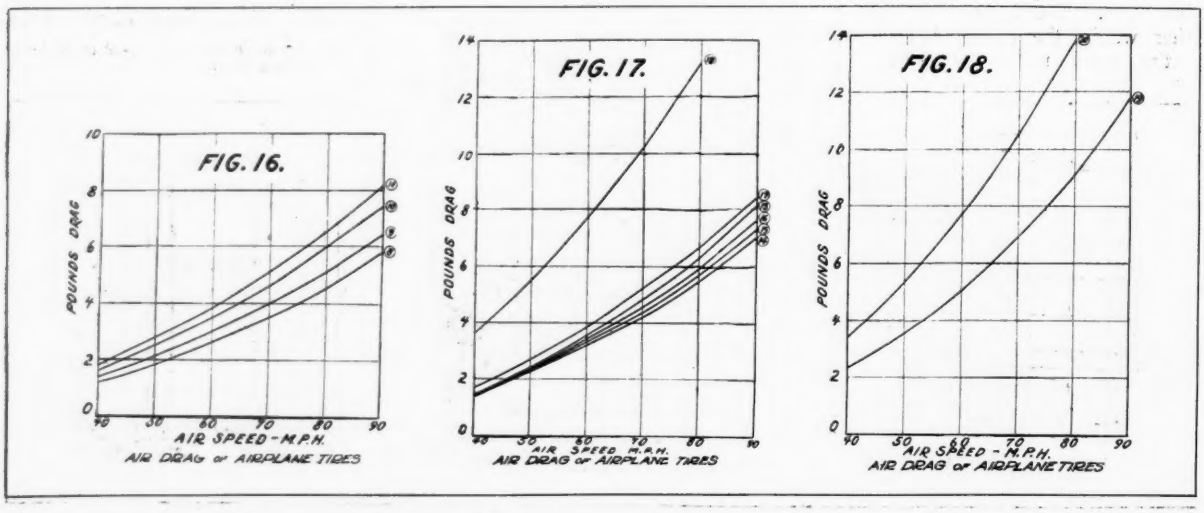
The drag coefficients have minimum values for 30 by 5-inch tires mounted on 28 by 4-inch wheels and slightly increase both for smaller and larger wheels. The scale effect is the most pronounced in the case of smooth tires mounted on streamline wheels; there is a decrease of about 8 per cent in the value of drag coefficient from 40 m.p.h. to 90 m.p.h.

A comparison of drag on tires of different tread shows that the safety tread tires have 5 per cent to 10 per cent greater drag than smooth ones. There is a saving in resistance of about the same magnitude by adoption of streamline tires. Streamline tires are still more advantageous in case they are set with some toe-in, as the increase in drag due to the toe-in of 6°.6 is about 45 per cent in the case of non-streamline tires, and only about 25 per cent in the case of streamline tires. This fact is of importance when it is considered that perfect alinement of the plane of the wheel with the path of flight may not always be easy to maintain in manufacture or service.

The test on the Silvertown 6.00-20 passenger car tire shows that substitution of this kind of tire for an airplane safety tread tire does not make a great difference from a drag standpoint, but the weight penalty is considerable.

The resistance of tire and wheel with the disk removed is about twice as great as the resistance with the disk on. Compare curves 15 and 18.

It is interesting to note the effect of oversizing upon the drag. For example, at 90 m.p.h. the 30 by 5-inch safety tread tire on a 28 by 4-inch wheel shows a drag of 5.81 pounds while the 32 by 6 safety tread tire on the same wheel shows a drag of 8.17 pounds, an increase of 41 per cent.



Tire Repairing

By the

Spot and Boot Method

THE exceptionally low prices at which tires have been selling for the past two years has made it necessary for the repair man to reduce the cost of repairing. Otherwise, it was more economical for the tire user to discard a damaged tire and buy a new one, as at the old schedule of repair prices a large repair might run to within 75 per cent of the retail price of a new tire.

The cost of repairing tires the same as manufacturing is based on depreciation and cost of operating equipment, materials used, and the amount of labor required to turn out a first-class job. All of these had to be considered when the repair man found it necessary to evolve a lower schedule of prices. How well he succeeded may be seen by the following comparison.

Safety Three-Cavity Vulcanizer

Old method of repairing a large cut or blowout using the step down section method and new material $1 per cross-section inch or $5.25 for a 30 by 5.25 balloon tire. Spot and boot method 50 cents per spot and $1 per boot or $1.50 for the same repair on any tire up to and including 6.00-inch cross-section and an additional 50 cents per boot for larger sized balloons. About the same ratio holds true where this method is used on truck and bus tires.

The difference in the spot and boot method and the old one is briefly: First, difference in equipment used; the old style equipment consisted of sectional molds for curing repairs on the tread and outside of the tire with a different mold for each cross-section size and corresponding curing arms for inside cures, making two cures necessary where there are both an inside and outside repair. With the new type equipment both inside and outside repairs are cured at the same time.

Again, the old type equipment was operated by steam with a pressure of some 50 pounds, which in itself was always a source of danger especially in the hands of inexperienced workmen, as well as requiring the constant attention of some one to prevent too high or too low temperatures.

Barnard Cord Skived Boot

Meyer Self-Cementing Patch

Buxbaum Cemented Boot

also to guard against explosions or other accidents. The new type equipment uses no boiler. But the cavities of each mold are filled with a paraffin solution instead of steam, and this solution reaches vulcanizing temperatures without reaching its boiling point; therefore, it is not under pressure and eliminates the dangers of explosions.

This paraffin solution is also a better heat conductor than water. No time is required for building up pressure and the mold can be ready for use much quicker than the old type steam operated equipment. As this fluid is not under pressure, there is no loss by evaporation, and one filling a year is sufficient to keep molds in good working order. In some installations these molds are heated by electricity, each mold operating independently and having thermostatic control; other installations are operated by gas, each mold having its own burner also with thermostatic control.

Furthermore, this new type equipment is made with removable adapters, making it possible for one mold to be used for as many as four different cross-section sizes so that with about four molds the repair man of today is able to take care of all our varied cross-section sizes by using the proper adapters.

Next is the difference in material used with the spot and boot method. No new material is used for inside repairs except cement, nor is the large amount used for the outside spot as was necessary with the old section method.

With the spot and boot method, except in tires of very large sizes such as truck and bus tires, no part of the casing is torn down, only on the inside the carcass immediately around the injury is skived down to a thin edge to allow it to form a perfect union with the boot. Then a portion of the inside tire for a space of some six to ten inches over all, or from three to five inches on either side of the injury, is buffed and coated with cement.

After the cement is thoroughly dry, the depression made by the skiving is filled with a small patch which has been constructed from an old casing, also coated with cement and covered with a ply of cushion gum about .03-inch in thickness. Over the top of this patch is placed a boot of suitable size, also made from an old casing, cemented and covered with the thickness of cushion gum. This completes the whole of the inside repair.

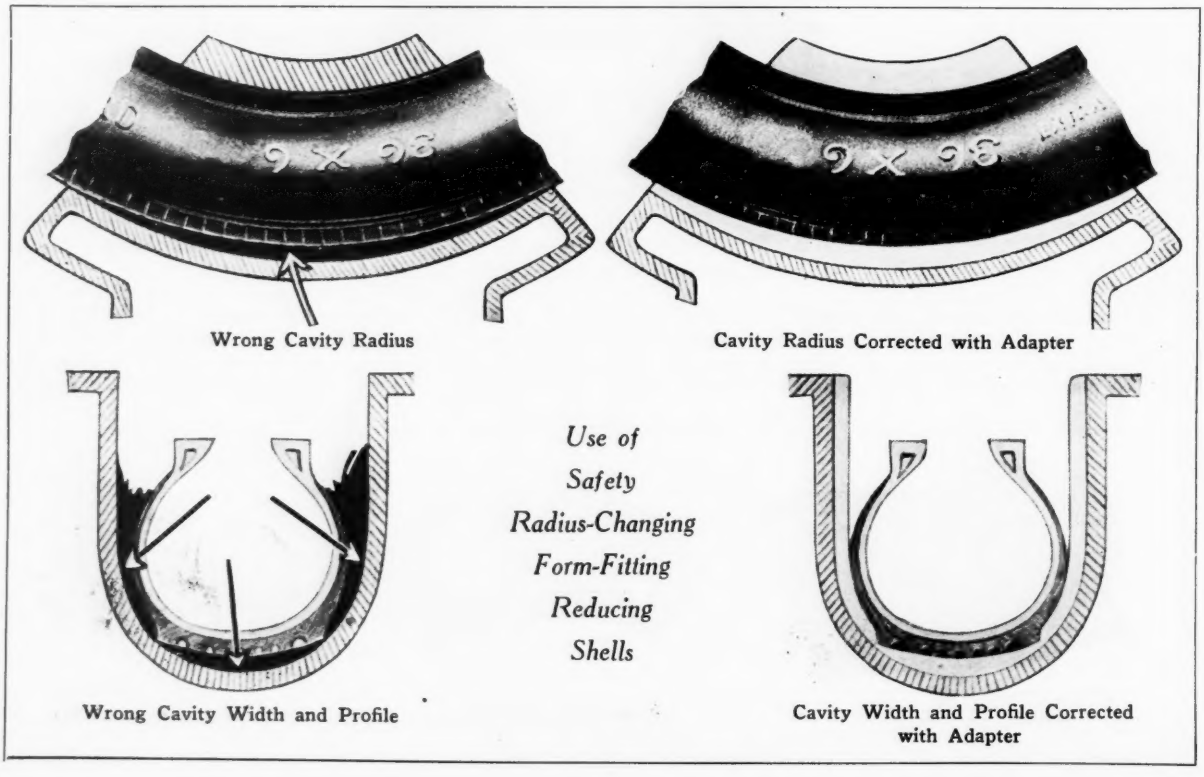
These patches and boots made from old casings are a staple article on the market and are supplied by all dealers in repair materials as well as most of the tire companies at a fraction of the cost of what would be required for new material. They may be had in all sizes to fit different injuries and tire sizes.

The outside of the injury is taken care of by cutting away just as little as possible of the tread or sidewall, also cutting on a skive, buffing, and coating with cement. After the cement is dry, the space is filled with tread stock and the tire is placed into a mold with the correct size adapters, a sectional air bag being used on the inside. Both inside and outside are cured at one time, the only cure inside necessary being the thin coating of cement and the light layer of cushion gum. Sufficient heat passes through from the outside to accomplish this cure by the time the outside tread is vulcanized.

The difference in labor required between the two methods has been estimated by the manager of one of the largest repair shops in New York City to be that one repair man can make ten spot and boot repairs in the same time it takes to make one by the old section method.

To the question of the durability of repairs by this method as compared with those by the old section method, it may be answered that this method is being almost universally adopted by the repair departments of the large tire companies where they are working for additional mileage, such as tires sold on a rental basis. They find also that of repairs made by this method a far smaller number go bad than of those made by the old method.

The question of this method of repair throwing the tire out of balance has been raised, but the manager of one of the larger commercial shops claims he has yet to hear the first complaint from a customer on this score. But he



heard many from the old method because the fabric used for section repairs was improperly cured, causing the repair to come loose, and complaints from this cause on repairs made by the spot and boot method are practically nil.

Further, the old method required a trained and experienced workman who was well acquainted with the construction and vulcanization of tires. With the spot and boot method any ordinary workman can learn it sufficiently well to turn out a practical and substantial repair after two or three days' instruction.

All in all, the tire repair business is in for a new era and the tire user, instead of throwing away his tire when it gets a small cut or stone bruise, as he did a few months ago, will go to the tire repair shop for a substantial repair at a fair price that is well worth its cost in the tire mileage it renders.

Rubber Division A.C.S.

New York Group

The New York Group of the Rubber Division, American Chemical Society, will meet Monday evening, December 16, at 6 o'clock, in The Town Hall, 123 West 43d St., New York, N. Y. The after-dinner program will be a symposium on the technology of rubber-fabric combinations. This topic has never been discussed in a symposium; yet it is of great technical importance and practical interest. This symposium is the last of the 1929 series, which have been most successful in stimulating group interest by disseminating reliable information on important phases of current practice in rubber technology.

Ten-minute papers will be read as follows: R. P. Dinsmore, chief chemist; Goodyear Tire & Rubber Co., Akron, O., "Balloon Fabrics"; Arnold R. Davis, Firestone-Apsley Co., Hudson, Mass., "Footwear Rubber-Fabric Combinations"; W. S. Sturtevant, chief chemist, Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., "Asbestos Combinations with Rubber"; K. E. Richards, technical director, Richards & Co., Stamford, Conn., "Rubber-Fabric-Pyroxylin Combinations"; E. H. Grafton, chief chemist, Vulcan Proofing Co., Brooklyn, N. Y., "Rubber Proofed Fabrics."

Walter Grotte will present certain specialty numbers during the evening of the sort that proved so entertaining at a former New York group meeting and at Atlantic City this fall.

Officers for 1930 will be elected also.

Dinner tickets at $2 each should be secured early from W. H. Cope, secretary-treasurer in care of R. T. Vanderbilt Co., 230 Park Avenue, N. Y.

Akron Group

The next meeting of the Akron Rubber Group will be held at the Firestone Clubhouse on December 9.

The speakers for the meeting are H. C. Young of Chas. MacIntosh & Co., Ltd., Manchester, England, and Dr. Warren Kendall Lewis of The Massachusetts Institute of Technology, Cambridge, Mass. Mr. Young will present a paper on "Some Engineering Problems of Rubber." Dr. Lewis has not yet announced his subject. The usual large attendance is expected since several important business matters are to be discussed and officers are to be elected for the year 1930. Dinner will be served in the clubhouse at 6:30.

Physical Testing Committee

A. A. Somerville has been appointed chairman of the Physical Testing Committee, Rubber Division of the American Chemical Society. The members of this committee and their connections are as follows: A. A. Somerville, R. T. Vanderbilt Co.; A. W. Carpenter, The B. F. Goodrich Co.; D. F. Cranor, Binney & Smith Co.; E. W. Fuller, The Fisk Rubber Co.; O. M. Hayden, E. I. du Pont de Nemours Co.; T. M. Knowland, Boston Woven Hose & Rubber Co.; Norman Madge, United States Rubber Co.; C. R. Park, Falls Rubber Co.; N. A. Shepard, Firestone Tire & Rubber Co.; W. L. Sturtevant, Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Akron Section, Monthly Meetings

Raymond P. Allen, chairman of the publicity committee, Akron Section, A. C. S., has announced its program for 1929-30. In the main it will consist of monthly meetings with principal speakers as follows: December 5, F. C. Frary, Aluminum Co. of America; January 9, F. E. Denny, Boyce-Thompson Institute; February 6, Harry A. Curtis, Yale University; March 6, E. R. Weidlein, Mellon Institute; April 9, C. A. Kraus, Brown University; May 1, open; June 5, open. The Akron Section will be pleased to have any visiting chemists attend its meetings, which will be held alternately at the Firestone, Goodrich, and Goodyear plants at 8 P. M. Each meeting will be preceded by a dinner at 6:30 P. M. at which visitors are also welcome.

Wage Payment Methods in Industry[1]

Three groupings are made of wage payment: straight time, including payment by hour, day, or week; payment by the piece; payment whereby standards are set and extra awards paid employes according to a definite planned schedule, this third general type being referred to in the study as premium or bonus. Figures on this third type do not include the sporadic and more or less opportunistic bonuses and gifts, such as vacations with pay, Christmas gifts, etc., profit-sharing plans, or life insurance.

The analysis revealed that 69.4 per cent of the changes in wage methods have occurred during the past five years; also that in plants of manufacturers who have adopted premium or bonus methods, manufacturing costs have decreased in 99.1 per cent of cases and average employe earnings have increased in 99.7 per cent of cases.

From six rubber companies, manufacturers of tires and other rubber products, reporting, it was learned that 50 per cent use the straight time method; 35 per cent, the piece rate; and 15 per cent, the premium or bonus plan. The general average for the 893 companies was: straight time, 66.4 per cent; piece rate, 24.1 per cent; premium, 9.5 per cent.

[1] Data from The Sherman Corp., 292 Madison Ave., New York, N. Y.

EDITORIALS

Studying Industrial Rationalization

AMERICAN manufacturers of rubber and other goods may learn much from the exhaustive survey being made and the comprehensive plan being worked out for the systemization and rationalization of the iron and steel industry of Italy. Makers of metal wares there have long had business ills quite like those of makers of rubber goods here, notably high costs, lack of proper standards, too many sorts and sizes, overactive competition in the national market, ill-distributed efficiency, and uneconomic, unscientific merchandising methods. They are going to make a united endeavor to minimize those troubles, and while their method may not wholly suit Americans, the latter nevertheless may better realize from such study how they, too, have much in common. It may even point a way for leaders in the rubber industry to make some similar concerted effort that will forestall extreme trade swings, turn frequently profitless into reasonably profitable production, and prevent disastrous disorganization in the domestic market.

* * *

Oil and Rubber Preparedness

SINCE the reference in this journal to the preparedness of a leading American rubber company through the production of synthetic rubber by a method of its own to offset any undue rise in the cost of plantation material, it has been hinted that its endeavors may be supplemented by those of another great American corporation dominant in a different line—oil production and refining. This latter concern, which has acquired the right to use and develop in this country the new German catalytic hydrogenation process, although primarily interested in its use in the cheaper production of gasoline and other crude oil products, is aware also of the opportunities that lie in adaptions of the process in large operations in other parts of the chemical field. Herein, it is surmised, it may prove of much service some day to the rubber industry.

Familiarity with the reactions whereby rubber may be synthetized from gasoline leads some to expect that with the aid of catalytic hydrogenation an ample supply of excellent rubber will be easily elaborated from a crude oil hydrocarbon base at the opportune time, not only in ample volume but at a price competitive with natural rubber. As for quality, they believe that there will be little amiss. If one works' chemist wants the isoprene molecules polymerized merely in rings while another wants them arranged in spiral chains with "methyl groups" attached, either specification may be readily filled. They insist that there is no inherent difficulty in thus building to order a useful rubber, and they remind us that similar problems once deemed as insurmountable have since been solved by resourceful chemists with "resourcefull" backers. Hence some old-timers in the industry who have seen so often the impossible of yesterday become the commonplace of today would not be surprised, when conditions are favorable, to find some refiners of oil also purveyors of rubber.

* * *

Waste-Ridding Ideas Pay Well

EVEN in well-regulated rubber manufactories it is conceded that much is lost through waste, that is perhaps largely avoidable; but the problem of eliminating waste on any large scale they have found hard to solve. Commonly the trouble has been in distinguishing which is or is not avoidable waste, and even when the leaks have been located, it has not always been easy to get the hearty cooperation of the working force in effectively lessening such loss. Some notable benefits have been obtained by rubber manufacturers through offering inducements to employes to suggest better ways to use apparatus or simpler means of carrying out processes; but to a much less extent have incentives been likewise proffered for getting rid of waste.

The Westinghouse Electric & Manufacturing Co. a few years ago elaborated a campaign for employe assistance in the minimizing of waste that proved so successful that many other large industries have since pursued a similar course and have had occasion to congratulate themselves. The Newport News Shipbuilding & Drydock Co., for instance, is reported to have effected a saving of $250,000 in 1927 through such a campaign. The Oakland Motor Co., too, is said to have spent $10,000 this year on such a movement, getting 3,385 suggestions from its 12,000 employes in response to an offer of $1,247 in prizes; and that 35 per cent of the ideas submitted had high value, while many others were quite helpful.

* * *

WITH MUCH SATISFACTION THE DIVISION OF SIMPLIFIED Practice of the United States Department of Commerce notes how in its efforts to eliminate waste it has met with the hearty cooperation of tire manufacturers. This is evidenced alone by the fact that in three years they have reduced the standard sizes of balloons from 43 to 17, the resulting benefit being widespread and considerable. Consumers have been getting better tires at much lower cost, manufacturing conditions have been put on a much sounder basis, dealers have been enabled to turn over stocks more frequently, and a problem in automobile equipment has lost its former complexity.

What the Rubber Chemists Are Doing

Adhesion Tension Values of Different Types of Carbon Black Against Water and Against Benzene[1]

F. E. Bartell and Carleton N. Smith[2]

COMMERCIAL carbon blacks from different sources exhibit widely different properties. Numerous attempts have been made to account for the diversity in properties of such carbons. The seemingly more plausible theories attribute the diversity to differences in crystal structure, effective surface area, and "activity." The third factor is, however, largely dependent upon either or both of the others.

X-ray studies have contributed much to our information concerning crystal structure of the different modifications of carbon. The diamond and graphite are generally accepted as being structurally distinctive forms. Opinions differ as to the structure of the so-called amorphous or microcrystalline form, though much of the evidence points to a definite crystalline structure for it. Microcrystalline carbon may, according to some investigators, appear in more than one form—as, for example, alpha and beta modifications.

Effective surface area of carbon depends not only upon the degree of subdivision, which may be regulated by soot deposition or by grinding and dispersion of massive carbon, but also upon the degree of surface roughening, as by pitting, etc., or upon the number and size of micropores which may be present.

The high "activity" of certain carbons has been attributed to crystal structure, to specific (effective) surface area, and to the presence of impurities. It has been found that ash-free graphite adsorbs succinic acid but leaves methylene blue untouched. Diamond powder adsorbs in the reverse order. Carbon black (methane soot) behaves like diamond, and activated anthracite like graphite. It thus appears that the precise crystal structure of a solid is important in determining its activity. The work of Miller has gone far to prove that activation of carbon does not necessarily require the presence of impurities, as has often been maintained. On the contrary, it has been shown that the presence of "impurities" on the surface tends rather to decrease the adsorptive capacity of carbon for other substances, inasmuch as the already adsorbed impurity has used up part of the adsorption surface. The conclusion seems justified that activity is largely a function of surface area.

It has been shown beyond reasonable doubt that different commercial carbon blacks possess different adhesion tension values against water and against benzene, and that heat treatment alters the adhesion tension of these carbons against different liquids.

[1] From a dissertation submitted by Carleton N. Smith to the Graduate School of the University of Michigan in partial fulfilment of the requirements for the degree of doctor of philosophy, 1929. *Ind. Eng. Chem.*, Nov., 1929, p. 1102.

[2] University of Michigan, Ann Arbor, Mich.

Health Hazards in the Rubber Industry

Compounding Materials[1]

L. J. D. Healy[2]

UNDER the above title the author presented at the Eighteenth Annual Safety Congress a summary of the investigation made by him and the Health Standards Committee on the toxicity of organic accelerators and antioxidants used in the rubber industry. The properties of these materials and the experience of users as to their toxic or non-toxic effect are reported in detail.

This list has been combined with those previously reported upon and the entire group of organic compounds has been rearranged and classified into groups according to their probable health hazards. The revised list including both accelerators and antioxidants and classified into groups is as follows:

Group A

Highly Toxic or Irritant
Avoid or Use with Extreme Precautions

Aniline
Hexa (See hexamethylene tetramine)
Hexamethylene tetramine
Ortho toluidine
Para nitroso dimethyl aniline
Para nitroso dimethyl aniline base B. C.
Para phenylene diamine
Para toluidine

Group B

Moderately Toxic or Irritant
Care Must Be Exercised in Handling

Aldehyde ammonia
Alpha napthylamine
Anhydro formaldehyde aniline (See methylene aniline)
Anhydro formaldehyde para toluidine (See methylene para toluidine)
B. B. Accelerator
Beta naphthylamine
Beta naphthol
Dimethylammonium dimethyl di thio carbamate
Formaniline (See methylene aniline)
Formaldehyde aniline (See methylene aniline)
Furac No. 3 (See lead salt of dithiofuroic acid)
Grasselerator No. 101 (See aldehyde ammonia)
Lead oxidation product of dimethyl di thio carbamic acid
Lead salt of dithiofuroic acid
Meta tolylene diamine
Methylene aniline
Methylene ditolyl diamine
Methylene para toluidine
RSL A-510 (See methylene aniline)
Super Sulphur No. 2
Triethyl trimethylene triamine

Group C

Slightly Toxic or Irritant
No Hazards with Proper Handling but Somewhat Hazardous with Promiscuous Handling

Albasan
Diortho tolyl ethylene diamine
Diortho tolyl thiourea
Diphenyl thiourea (See thiocarbanilide)
Diphenyl ethylene diamine
Ethylidine aniline
Hydrofuramide
Methylene di anilide (See methylene diphemyl diamine)
Methylene diphemyl diamine (See methylene phenylene diamine)
Methylene phenylene diamine
Neozone (Standard)
Neozone B
Neozone C
Oxynone
Phenex
Quinoidine
Resistox
RSL A-1 (See thiocarbanilide)
RSL A-7 (See ethylidine aniline)
Safex
Stabilite
Stabilite Alba
Thiocarbanilide
Trimene (See also triethyl trimethylene triamine—In Group B)

[1] Extracts from "Transactions of Annual Safety Council, 1929," to be published complete about Jan. 1, 1930.

[2] The Fisk Rubber Co., Cudahy, Wis.

Group D

Relative Toxicity—Low
No Hazards with Ordinary Handling

Accelerator 18X
Acetaldehyde aniline
A. G. Accelerator
Agerite Powder
Agerite Resin
Agerite White
Antox
Butene
Butyraldehyde aniline
Captax
Crylene paste
Crylene powder
Crylene X
Diortho tolyl guanidine
Diphenyl guanidine
Dovans W-29
Dovans W-80
Furac No. 2
Grasselerator 552
Grasselerator 808
Grasselerator 833
Heptaldehyde aniline
Heptene
Mercapto benzo thiazole
Monex
Neozone A
Neozone D
Novex
Phenyl alpha naphthylamine
Phenyl beta naphthylamine
Phenyl tolyl guanidine
Piperidonium pentamethylene dithiocarbamate
RSL A-16
RSL A-19
RSL Z-88
Supersulphur No. 1
Tetramethyl thiuram disulphide
Tetramethyl thiuram monosulphide
Thionex
Tolyl phenylguanidine
Triac
Triphenylguanidine
Tuads
Ureka
V. G. B.
Vulcanol
Vulcanex
Vulcone
Zimate
Zinc butyl xanthate
Zinc ethyl xanthate
Zinc isopropyl exanthate
Zinc oxidized salt dimethyl di tho carbamic acid
Zinc salt of dithiofuroic acid

Determination of Total Moisture in Carbon Blacks[1]

C. M. Carson[2]

IN THE course of an extended research on various grades of carbon black, determinations of total moisture were made by an adaptation of an old method. The method used was similar to one described by Allen and Jacobs[3] for measuring water in tar. The chief difference in the present method is that small amounts of moisture in carbon blacks must be weighed, whereas the larger amounts in tar could be measured. The difficulties in weighing the evolved moisture are described in the ensuing method of determination.

Five grams of carbon black were placed in a 500-cc. round-bottom flask with 25 to 35 cc. of dry xylene and 200 cc. of dry mineral oil. A short air condenser led to the bottom of a 25-cc. distilling flask, which in turn was connected to two or more calcium chloride tubes. The flask containing the sample was heated to 150-175° C. in an oil bath, a stream of dry nitrogen being passed through the apparatus. The water and xylene were distilled into the small distilling flask and thence, by warming in a water bath, into the calcium chloride tubes, the current of nitrogen being continued. It required but a few minutes to remove the water from the xylene, indicated by the disappearance of cloudiness, and the calcium chloride tubes were then connected directly to the nitrogen line and the gas was passed through until the tubes reached constant weight. Xylene is not adsorbed by calcium chloride and nitrogen does not remove water from it at room temperature during the time required for the experiment. The increase in weight of the calcium chloride tubes is the amount of water in the sample of carbon black. The amount of water thus determined is considerably higher than the 105° C. oven loss in 5 hours, and indicates that most of the moisture is of the "bound" or "capillary" type.

A comparison of the moisture as determined by the xylene method and the 105° C. oven is shown in the table:

Black	Total H_2O %	105° C. Loss %
Micronex No. 1	5.75	1.42
Micronex No. 2	5.96	1.85
Micronex No. 3	5.20	1.56
Heated Micronex (950° C.)*	0.98	0.00
Cabot No. 1	4.88	1.79
Cabot No. 3	3.54	1.66
Cabot No. 2	5.41	1.57
High-temperature black†	0.87	0.30
Acetylene black No. 1	3.19	0.07
Acetylene black No. 2	3.67	0.07
Goodwin	1.50	0.33
Thermatomic (Special)	1.25	0.10
Lampblack	6.75	3.26
Super-Spectra	1.07	0.10
Zinc oxide‡	0.75	0.02

*Heated 10 minutes at 950° C. in a closed crucible.
†Made at 1500° C.
‡Added for comparison.

The relationship of this "bound" moisture to any physical property of a rubber mix containing the black could not be shown. It is probable that other characteristics of the black, such as adsorptive capacity, particle size, etc., are more effective in causing variations than the amount of moisture. Nevertheless the large amount of water in blacks as compared with that in other pigments, such as zinc oxide, indicates their adsorptive capacities.

[1] *Ind. Eng. Chem.*, Analytical Ed., Oct., 1929.
[2] Goodyear Tire & Rubber Co., Akron, O.
[3] Allen and Jacobs, *Orig. Com. 8th Intern. Appl. Chem.*, 10, 17 (1912); *C. A.*, 6, 3178 (1912).

Physical Testing Committee, Rubber Division, A. C. S.

The work of the committee for the year can be divided into two phases: (1) the completion of the investigation on the effect of temperature and humidity on testing, and (2) work on a specification for rubber testing.

(1) This problem was concerned with the effects of temperature and humidity on the abrasion test. This work has been completed, and the results published. It was found that more consistent results can be obtained by controlling the temperature, but that the test is not particularly sensitive to changes in humidity.

(2) The report of the Crude Rubber Specifications Committee at the Swampscott meeting showed that the results from different laboratories, working under supposedly standard conditions, were in very poor agreement. The recommendation was made at that time that the Physical Testing Committee address itself to this phase of the problem of rubber testing. Accordingly, it was decided to make a thorough investigation of the possible sources of variation, for the purpose of drawing up a specification which would give a better agreement between the results of different laboratories. The first step was to secure from the various members of the committee and others a list of the variables which should be considered as affecting the results. Information on the actual methods in use was then obtained from a large number of laboratories. These data showed that the methods used in different laboratories differ widely in the essentials, and that comparatively little attention has been paid to previous recommendations of the committee. Taking these results as a basis, an attempt was made to draw up a tentative specification. Information is lacking on certain points, and this is being obtained by experimentation at the Bureau of Standards. When these points are settled, the committee plans to prepare and submit a tentative specification for consideration and trial.

W. A. Gibbons, Chairman.

Effect of Temperature on the Acetone Extract of Vulcanized Rubber Exposed to Sunlight[1]

T. Yamazaki

Having shown that the quantity of acetone extract of undercured rubber exposed to sunlight in summer is higher than that from overcured samples, while the contrary is true in winter, the author determined to discover why this is so. Rubber mixings containing 7.5 per cent sulphur were vulcanized from 60 to 300 minutes and on the one hand maintained at temperatures over 50° C., and on the other hand, at temperatures under 20° C. The samples were exposed to the intense sunlight in September and again to the sunlight in winter.

The results prove that the acetone extractions of vulcanized rubber exposed to sunlight depend on the temperature of the exposure and not on seasonal differences of sunlight intensity.

[1] *J. S. C. I.*, Japan, 31, 273, 5 (1928)

Surface Vulcanization in Ultra-Violet Light[1]

R. Ditmar and O. Grunfeld

These authors have carried out a number of tests from which they conclude that true surface vulcanization of rubber spread on cloth or glass takes place on exposure to ultra-violet light. The sulphur present in a rubber mixing is activated by the light and is thereby made to react on the rubber. The ultra-violet light proved a first-class catalyzer, activator, and accelerator, and mixings containing 3 per cent of sulphur, but no accelerator, were vulcanized in about 8 minutes. While sulphur proved to be essential in ultra-violet light vulcanization, apparently organic accelerators could be dispensed with. In fact it was found that most accelerators give unfavorable results in ultra-violet light, the mixings becoming usually very tacky. The exceptions among the accelerators were Vulcafor R, Vulcafor VI, Accelerator Z88, and A11. But the first gives a brown color, the second vulcanized at room temperature, and Z88 produced bubbles.

Tests with so-called vulkan colors gave very good results in ultra-violet light vulcanization. In addition it was found that methylene blue and selenium red also combine very well when subjected to ultra-violet light.

Vulcanization takes place at temperatures ranging from 20 to 90° C., in 4 to 8 minutes, depending upon the material on which the rubber is spread, the most rapid cures taking place on glass. The determining factors here are, of course, the varying heat-retaining and heat-conducting powers of the different surfaces used.

[1] *Gummi-Ztg.*, Sept. 13, pp. 2801-03. *Ibid.* Sept. 20, pp. 2859-61.

Reversible Latex for Fabrics[1]

For coating textiles, concentrated reversible latex has unique advantages over other forms of rubber, one of the most important being the elimination of inflammable and health-harming solvents, and the necessity of recovering them. An advantage, too, is the ability of such latex to carry a loading as of chalk, talc, barytes, lithopone, etc.; and with such material the rubberizing of double textures can be done as easily as the coating of single-ply fabric.

The latex paste[2] (ordinarily holding about 25 per cent of water) is suitably modified and put under the knife of a spreading machine. The coating having been put on the fabric, care is taken to effect the doubling before the water in the coating has been fully evaporated. The fabric thus doubled can be dried on either a table or drum. Where but one ply is coated at a time and it is desired to rubberize each one separately, the two are dried apart and then doubled by the ordinary method.

To get perfect impermeability responding to all needs, sufficient reversible latex is applied so as to leave on each ply about 100 grams of the paste per square meter after the water has dried out. The cost of such material for rubberizing garment or other fabric should run from 1 franc 25 centimes to 1 franc 30 centimes per square meter. No copper utensils should be used as the latex dissolves copper.

Although its use is relatively new, its merits are such as to justify the use of such latex soon in many industrial applications and particularly in the making of transmission belts.

[1] Walter Hutchinson, of Etablissements Hutchinson, established 1853, at Montargis, Loriet, France. *Rev. gén. Caoutchouc*, Aug.-Sept., 1929, p. 5.

[2] "The Revertex Process," India Rubber World, Mar., 1927, p. 315.

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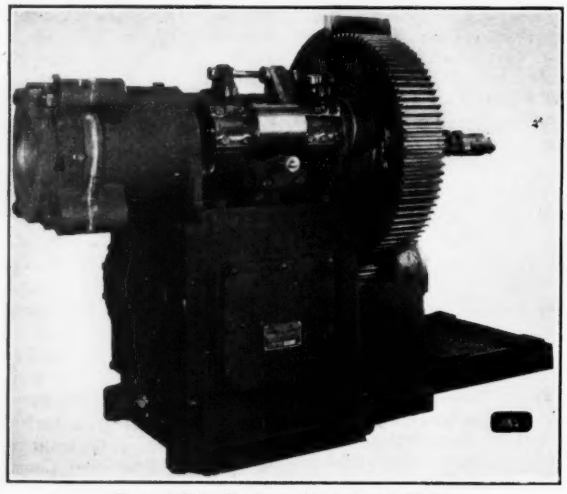
Ticonderoga Flake Graphite

Flake graphite for lubrication has long been recognized as indispensable for lubricating every kind of mechanical movement. A surprisingly small amount of suitable grade graphite, either dry or mixed with oil or grease, applied regularly works wonders. Any more than enough to produce the desired veneer cannot find a place on the frictional surface. A hundred years of experience in manufacturing graphite products has perfected grades for rubber manufacturing as well as machine lubrication and other needs.

New Machines and Appliances



Farrel-Birmingham Roll Feed Tuber

Roller Feed Tubing Machine

THE outstanding feature of the tubing machine here pictured is the roller feed by which a uniform supply of stock is automatically fed to the screw, thus maintaining a maximum output and a more uniform product. The roller is located opposite the feed opening and is driven directly from the drive spindle through a pair of gears of the proper ratio to cause a constant push on the stock into the flutes of the screw. Whether fed from conveyer or by hand, this condition exists as long as stock is feeding over the roll.

This power feed eliminates the personal attention that the operator must give to the ordinary tubing machine in which the stock is pushed into the opening by hand. It also eliminates the danger of the operator having his fingers or hand caught in the screw. With the roller feed it is absolutely unnecessary for the operator to push the stock into the machine.

Several machines in operation on a variety of work in one of the largest Akron factories give approximately 15 per cent greater production on the average than is obtainable from other machines of similar size. On some stocks the increase in production is as high as 20 per cent.

The cylinder of the tuber is steam jacketed, and the screw or worm is bored and fitted with stuffing box for steam or water connection. The screw is machined all over, and the threads are cut with varying pitch in accordance with the latest practice. The screw is provided with an anti-friction bearing of large capacity to take the end thrust.

The machine may be arranged for drive by A.C. or D.C. motor. For alternating current a motor with four set speeds is used, and the machine is provided with a two-speed drive so that eight different speeds are obtainable. The two-speed reduction unit, mounted in the base of the machine, has Farrel-Sykes cut double helical gears, and the main drive gear and pinion are cut spur, as shown in the picture. Anti-friction bearings are used throughout.

If a direct current variable speed motor is used, the drive is through a single pair of gears of high ratio. These drive gears may be either the Farrel-Sykes cut double helical type or worm gears. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Convertible Vulcanizing Plate

AN electrically operated convertible vulcanizing plate for inner tube work is now available. Its special feature is a three-clamp plate that can be used in any desired position, attached to the wall, a bench, or with its curing surface inverted. It is thermostatically controlled and will reach full curing heat in five to seven minutes by simply connecting to any 110-volt light socket. The Franz Foundry & Machine Co., Akron, O.

Cord Fabric Spreader

THE rubber spreading machine pictured is of special design for rubberizing cord threads and combining them into compact cloth or sheet form. As indicated in the diagram, the single cord threads are wound on bobbins which are placed in a weaver's frame or creel. As many bobbins as are necessary to produce cloth of a given width are set longitudinal to the machine. The single threads run from the bobbins through a mechanism in which they undergo uniform stretching. They are then pulled through a comb *a* in orderly arrangement and are led over a stretcher roller *b*, then over a thread arranger *d*, over stretcher roller *g*, and then they are rubberized with the aid of a spreading knife or a roller. The benzine dissolved rubber mixture is applied in advance of the roller *i* or the knife. The rubberized threads then run together as close as possible round roller *k* and a heated drum *h* to be dried.

After leaving this drum, the assembled cloth is led over the rollers *m* and m^1 around a second drum contrivance indicated at the right of the figure for rubberizing the other side of the cloth. The second rubberizing is applied at *l*, from which point the double-coated cloth proceeds over roller *k*, and around drying drum *h*. The dried cloth passes over roller *m*, and is wound on drum *A*, located between the two machines. This winding is done at high speed. When necessary to apply a heavier layer of rubber for certain kinds of cloth, the repeat spreading installation is used. The heating drums are encased to collect

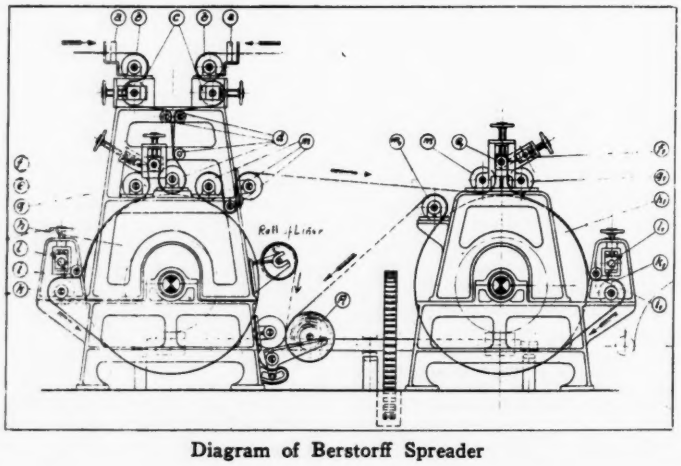


Diagram of Berstorff Spreader

the benzine vapors. These are condensed, saving a good percentage of the solvent. Hermann Berstorff Maschinenbau-Anstalt, G.m.b.H., Hannover, Germany.

Accurate Compounding Scale

UNIFORMITY in rubber mixings is so necessary for economy and quality of output that progressive rubber manufacturers at great trouble and expense place the mill room under a system of strict control. An essential item in any such system is accurate weighings of the ingredients. Accuracy is particularly important as regards weighing accelerators, especially those of the more active sorts where variations in weight profoundly affect workability of the stock in processing and reliability of the cured product.

A scale is here pictured that is distinctive for its recovery of invisible loss not disclosed on ordinary scales. It is even balance in principle, weighing the materials against sealed weights and indicating variations from the exact weight by an over and under dial indication which magnifies weight errors beyond the possibility of oversight.

The scale is quickly responsive, highly sensitive, and practical. It visualizes fractional divisions of an ounce when ordinary scales visualize fractional divisions of a pound. The indicator or pointer travels at the rate of one inch to one ounce. It does not move until the material being weighed is within 2 ounces of the predetermined net weight.

It is this 2-ounce visible approach to the

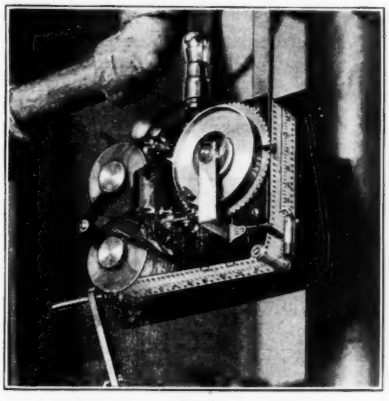
Model 346-C Exact Weight Scale

finished net weight that instantly visualizes the completion of the operation and prevents over or underweight errors. The Exact Weight Scale Co., Columbus, O.

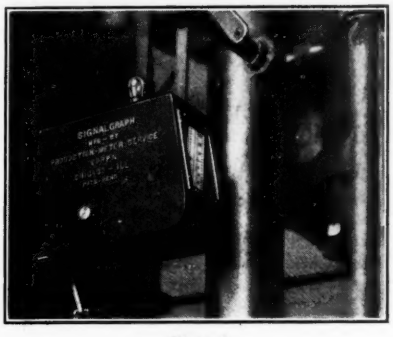
Recording Signal Meter

A PIECE of equipment essential for the efficient operation of a press on mold work is the device here pictured. It is a meter used for recording the length of time of plastic cures and signaling the operator when the predetermined time of cure is reached. It has an eight-day chart graduated in hours and minutes; six inches representing one hour. The meter is so arranged that the recorded end of the chart can be torn off and unrecorded part left in the meter. The meter is actuated by a Telechron motor movement which receives its power from the ordinary 110 volt 60 cycle A.C. lighting circuit of the plant.

The illustrations show a mechanically operated meter applied to a hydraulic press. The crank arm is attached to the moving part of the press through a connecting rod of the proper length, so arranged that when the ram of the press is moved to the closed position, the pen arm is moved to the right of the chart and the



Open



Closed

The Signal-Graph

time mechanism is set in motion through the closing of the clutch in the center of the minute wheel. Both the chart and the dial are timed identically. The length of time the press is closed shows on the dial and is recorded on the chart.

The notched wheel at the right of the time dial or minute wheel, is graduated in minutes also and is moved to the position required to obtain the desired curing time at which the signal is to be given to the operator. This wheel is locked in this position by a simple mechanism and remains fixed until unlocked and moved by hand to a new time setting. By another adjustment, not shown in the picture, it is possible to set to exact seconds if desired by simply turning a micrometer screw to the proper position with the meter in operation.

When the press is closed, the time dial is set in motion by closing the clutch. When the predetermined time is reached, an electrical contact is made which closes the signal circuit operating a bell or light to signal the operator. If this signal is not heeded, the chart will record the length of overcure and the signal will continue to show as long as the press is allowed to remain closed, thus calling attention to the fact that the operator is not "on the job." Production Meter Service Corp., 1315-25 South Wabash Ave., Chicago, Ill.

Foremen's Shop Desk

NO MORE permanently satisfactory shop furniture, such as workbenches, operators' seats, foremen's desks, etc., exists than these articles fabricated in sheet steel.

Referring to foremen's desks, these are of usual box form with inclined writing surface with pigeon-holes or a box at the back and locked drawer below for papers, etc., as pictured in the illustration. On the right side of the desk several hooks

Foremen's Steel Desk

are attached for filing temporarily papers or samples.

This desk has long legs to allow standing while working, and they are detachable to permit the desk to be placed on a bench if desired. A convenient lower shelf adds to the usefulness of the desk. The durability, convenience, and fireproof quality of its construction makes this desk very desirable as economical factory equipment. Standard Pressed Steel Co., Jenkintown, Pa.

Tire Inflator

THE device here pictured is a service-tested tire inflator designed for absolute accuracy throughout its range of 24 to 120 pounds pressure. It is said not to be affected by shock or the rough handling incidental to common service station use.

In operation, the inflator is extremely simple. Upon application of the chuck to the tire valve, the true tire pressure is read on the indicator on the gage. The action is instantaneous and positive. If greater pressure is desired, the thumb-lever is pressed, and full compressor head of air goes direct to the tire valve. Releasing the lever, the gage instantly shows new tire pressure. For less pressure, the chuck is tipped.

Air-line pressure does not appear on the gage at any time. There are four small valves within the inflator body. During the downward stroke of the thumb-lever, two of these close and seal the air passages to the gage, the two open between the main air line and the chuck. When the lever is released, the action is reversed, the main air line is blocked from the in-

Diamond-U Tire Inflator

flator body, and only the tire pressure reaches the gage.

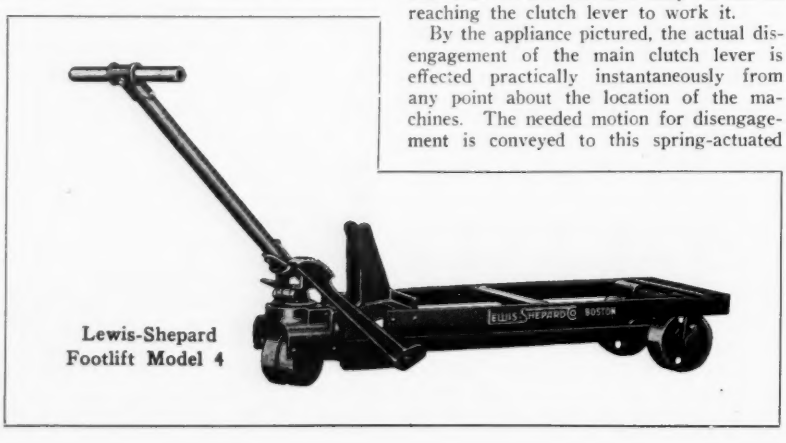
The gage is made chiefly of duralumin, and the entire unit, including hose and chuck, weighs but 12 ounces. The chuck is swiveled to allow perfect flexibility of adjustment to the valve stem. Foreign particles are excluded from the interior of the inflator by means of a small wire screen. Service Equipment Co., 8459 South Dearborn, Southgate, Calif.

The Footlift Truck

HAND-TRUCK movement of material is virtually inevitable in every manufacturing establishment. In a rubber plant with the movement of batches from compound room to mixing department and of the mixed stock onward to storage and processing, trucking is always going on. For this work lift trucks handling loads on platforms are generally favored.

Hitherto, such trucks were operated by a single stroke handlift. This method has now been improved upon by the footlift type illustrated here. It is built on a design requiring less manual work than the usual lift truck. The handle is never connected with the load and is used only for hauling and steering.

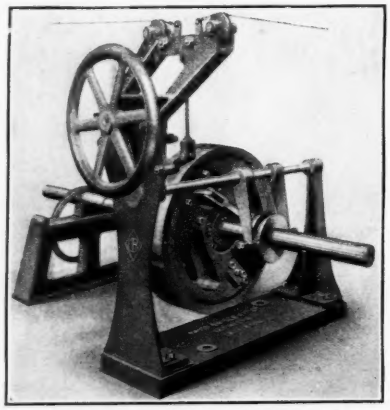
This new design of truck is built for loads up to 3,500 pounds. It is of simple, heavy construction with vertical release check. Other features are Alemite push type lubrication, Hyatt roller bearings, wide link bearings, double locking mechanism, double speed with safety at all times. Lewis-Shepard Co., Watertown Station, Boston, Mass.



Lewis-Shepard Footlift Model 4

"Acme" Safety Release Gears

THE device pictured represents an effective safety device of English design and manufacture. It finds application on rubber working and other heavy and dangerous machines such as mills, washers, calenders, etc.



Bridge's "Acme" Safety Release Gear

This appliance consists of a spring-actuated safety release gear for use in connection with main drive friction clutches for quickly throwing them out of gear in case of accident or other urgent necessity.

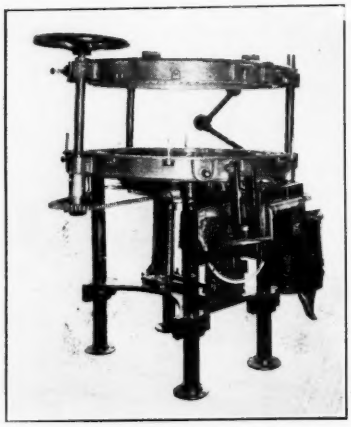
Where machines or groups of machines are in use, and to which the power is conveyed through a main clutch, it is necessary to provide stopping and starting means. Usually a clutch actuating lever is employed suitably fulcrumed and adapted to work the sliding sleeve of the friction clutch. When an accident occurs, the sooner the clutch can be disengaged the better, but in the case of groups of machines and with power conveyed through the same friction clutch for several machines much valuable time may be lost in reaching the clutch lever to work it.

By the appliance pictured, the actual disengagement of the main clutch lever is effected practically instantaneously from any point about the location of the machines. The needed motion for disengagement is conveyed to this spring-actuated gear device by means of a rope which is led around in close proximity to the machine and is capable of being seized at any point, causing sufficient pressure to release the clutch. Pulling the rope releases the stored energy in the spring and utilizes it to disengage the clutch and cut off the power from the machine power line. David Bridge & Co., Ltd., Castleton, Manchester, England.

Full-Circle Tire Mold

THE new piece of vulcanizing equipment shown in the illustration functions collectively as an automatic, motor-driven, full-circle, rebuilding, and retreading tire mold. It is adapted to cure all sizes of passenger-car tires from 3½ to 6.75 inches including 30 by 5 truck tires. A second model of the mold is built for handling truck and bus tires exclusively.

These molds cure a rebuilt or retreaded tire with perfect tread design, new sidewalls, and name imprinted, if desired. Retreads can be cured without removing the old name. An electric ball-bearing motor opens and closes the mold, and the tire is automatically pulled loose without pinching or stretching the tire carcass. Adjustments or clamping are unnecessary as the motor does it all. Matrices can be quickly changed by one man while the mold is hot. Only one man is necessary to operate the unit. The boiler is connected to the mold with flexible swing joints, which eliminate hose connections.



Bacon Full-Circle Mold

The mold is opened and closed by raising or lowering the upper half by means of the three screens, which are turned in unison by a hand-wheel on one of them, connected with the others by sprocket and chain transmission. When closed, the half molds are clamped together by a double-bar swing-joint with hand-wheel screw as the compression element.

The molds are self-adjusting to fit all sizes and makes of tires; matrices are locked in without the use of screws. They cure all 18-inch and 19-inch rim tires as well as the larger rim sizes. The tires are cured in their natural shape and the safety clamp will not allow the mold to open until the air is removed from the air bag. Bacon Vulcanizer Mfg. Co., Oakland, Calif.

Rubber Factory Topics

Rubber Plugs for Oil-Well Cementing

IN order to exclude water met with at various strata of oil and gas sands in drilling oil wells so that it may not interfere with nearby wells, cement must be forced into the opened water-bearing layers.

In the long-used dump-bailer process liquid cement is lowered to the bottom in a bailer or 30- to 40-foot tube inside the casing having at the bottom an automatic valve that allows the bailer to be emptied and withdrawn. The casing is then raised above the cement level, filled with water, capped with a steel plug, and lowered to the bottom of the hole. The column of water forces the cement out through apertures at the bottom of the casing, and the outer space between the casing and the earth wall is filled. Many bailer loads are often necessary to place a few tons of cement.

As an improvement on that process, the plugging or Parkins method has lately been extensively favored. One type of plug used has a redwood center, a synthetic plastic pin and nut, and a leather cup and disk cut from belting. Sometimes concrete replaces the wood, but all plugs must be drilled up after the cement has set. To simplify such process, expedite work, and gain in efficiency, the newly-patented Zelam plug is being tried out by several big oil companies, and tests thus far are said to be very satisfactory.

The Zelam plug-sets are unique inasmuch as each unit is a solid, homogeneous mass, having a flexible, fibrous, central reenforcement and a tough, resilient, abrasion-resistant rubber on the outside, expanding circumferentially, and capable of standing the utmost pump pressure Leather parts wear easily, and wood, metal, and concrete in being drilled up often damage pumps. Zelam plug-sets are free from such objections.

In operation, after circulation is established downward through the casing and up outside of it, bottom plug *A* is inserted, a suitable amount of cement is forced in upon it, then top plug *B* is set above the cement. When the fittings have been replaced, water or mud is forced in to push the plug and cement down to the desired level whence the cement issues through the casing apertures and presses up the sides of the well hole. The cement is kept from intermingling with other fluids, and when the top plug *A* comes to rest in a recess at the top of the bottom plug *B*, an effective water shut-off is assured. West American Rubber Co., 400 N. Ave. 19, Los Angeles, Calif.

There Are Two Kinds of Machine Insurance

When a manufacturer buys a costly piece of machinery, one of the first things he usually does is to insure it against possible loss. The amount of the insurance is little enough to pay to protect such a big investment.

The cost of the very best of lubricants is also insignificant compared to the cost of the machine it lubricates. And good lubricant also protects the investment, as many manufacturers have found out when they tried to skimp on their oil.

All too often the selection of lubricating oil is done in a slipshod manner. Proper consideration of the right lubricant requires a technical knowledge of lubrication. This is supplied by the lubrication engineers of reputable oil companies. It pays to consult them.

Oil Power.

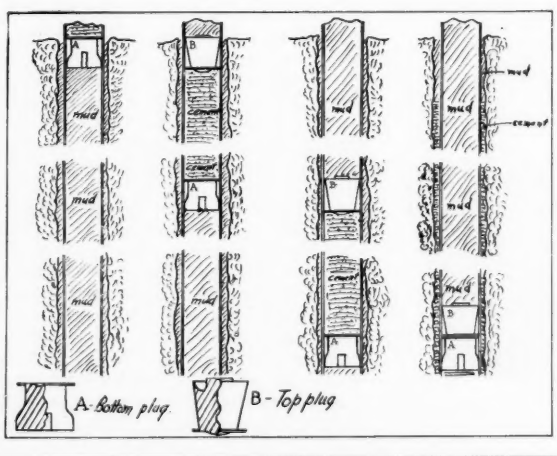


Diagram Showing Progressive Operation of Zelam Plug Sets

Rubber in Etching

ETCHING with a rubber stamp such as the application of a trade mark to a metal, particularly steel and nickel, has been found an excellent method by many, including manufacturers of saws. Briefly, the process is as follows:

The section of the metal to be etched is coated with a thin mixture of an alcoholic solution of gum guaiacum. A strong solution of caustic soda is then applied to a regular ink pad. The rubber stamp is next pressed upon this pad and then to the gum-treated metal surface. The gum adheres to the stamp, baring the metal. The excess of caustic soda is sponged away with clean water. An etching medium consisting of a mixture of strong nitric acid (1 part) and water (2 or 3 parts) is then applied.

Plastometer Readings

THE well-known plastometer, of Pusey & Jones, for measuring the hardness or density of vulcanized rubber, like other fine instruments and mechanisms, requires care in its use. Occasionally it may be well to have its performance checked by the maker if its readings are suspected of inaccuracy. Plastometer readings are almost universally taken with the ⅛-inch ball on the end of the plastometer needle.

When the instrument was first invented, it was intended to be used with the ⅛-inch ball for practically all kinds of commercial rubbers, but the instrument was furnished with a second ball, the ¼-inch, to make it of more general application and to fit it for testing substances much softer than rubber. Therefore, it is necessary for all plastometer readings to be designated as made "with the ⅛-inch ball" or "with the ¼-inch ball."

Readings in terms of the ¼-inch ball are readily transferred into ⅛-inch ball readings by multiplying by 6 and dividing by 5.

The following table of comparative plastometer readings are so figured:

⅛-Inch Ball	¼-Inch Ball
30	25
40	33
50	41½
60	50
70	58
80	66½
90	75
100	83

New Goods and Specialties

Avon Pedestal Mats

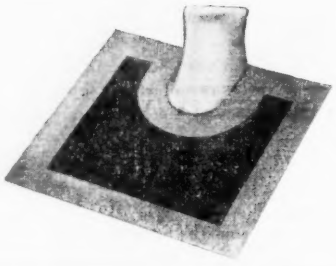
RUBBER mats are designed for a variety of purposes. The pedestal mat, here illustrated, is an English product. It is clean and hygienic because it may be easily washed with soap and water. Its cavity fits most pedestals, but, if necessary, it can be trimmed to fit an outside. Its size is 24 by 24 by 3/32 inches. The mat is made of hard-wearing rubber with a white border and a handsome marbled design in the center. It can be made in fluted pattern or plain, and in any combination of colors including blue, green, and brown marbled; stone; light green; blue; brown; and terra cotta. The Avon India Rubber Co., Ltd., 343-5 Euston Rd., London, N. W. 1, England.

Adjustable Recoil Pad for Discriminating Shooters

MANY pads have been invented for attachment to gun stocks for absorbing the recoil of the piece against the shoulder when discharged. These devices are generally of rubber but are designed without provision for adjusting their cushioning effect. This omission has been supplied in the rubber recoil pad here pictured, and its recoil absorbing quality can be readily varied to meet the desire of the individual user.

The fact that a gun pad is made sufficiently resilient to protect the shoulder does not imply that it will necessarily satisfy all shooters, as one person may like a soft pad while another will prefer a firm or even relatively hard pad. Also pad manufacturers have overlooked the fact that the upward kick of the gun stock often injures the face of a gunner. The manufacturers of this device consulted the leading rubber experts before adopting the specifications for their pad.

The Black Diamond pad is molded of special red rubber that retains indefinitely its resilient quality and is united to a hard rubber base in a manner distinctly improved over the usual method of making vulcanized unions. It is molded in



Rubber Mat

two sizes, 5⅛ inches and 5⅛ inches, and pierced by two layers of holes extending from side to side of the pad, the holes of each layer being in staggered relation to those of the other. The holes nearer the hard rubber base are connected in pairs from end to end as part of the cushioning construction of the pad.

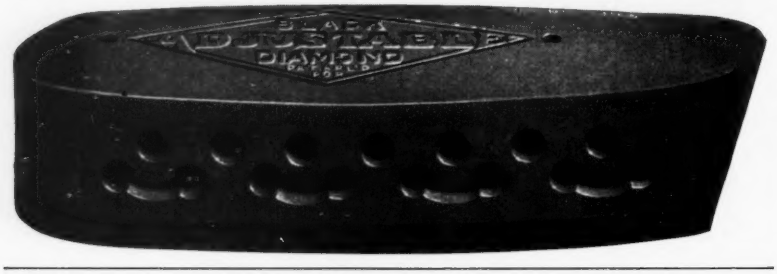
The adjustable feature comprises plugging the holes in the pad by use of black rubber cord furnished with each pad; different combinations can be had as desired. Plugging the holes at the "heel" causes the muzzle of the gun to whip down instead of up and eliminates all possible chance of the comb of the gun hitting the cheek-bone.

In many cases, the pad, without any of the holes plugged, is just as wanted.

You will notice that when pressure is exerted on the pad, the slots between the holes close first. With additional pressure the holes connecting with the slots close; with further pressure, the single holes begin to close. This progressive action tends to equalize the difference in recoil between light and heavy loads, and also helps steady the gun because a progressive recoil does not disturb the alinement so much as a short, sharp one does

The resilience of the pad is modified and adjusted readily according to individual preference after the following manner:

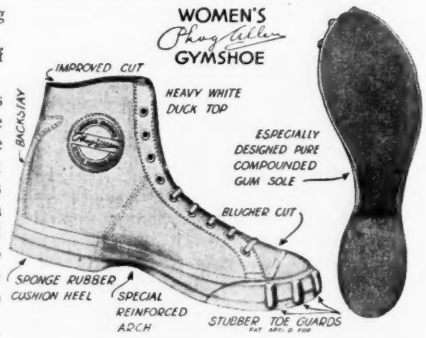
The gun stock is held between the knees leaving both hands free to insert a length of the rubber cord using the wire lacing tool furnished for the purpose. After passing the lacer through, it is grasped in one hand and the end of the attached cord in the other. The cord is stretched slightly to decrease its diameter and permit it to pass readily through the hole. The cord should not be dragged through the holes but placed within them full size. The slight stretching suggested above does not prevent the cord from recovering its full diameter when the tension is released. Water serves as a lubricant for rubber; therefore, it is best to wet the holes and cord before attempting the plugging operation. The Black Products Co., 135th St. & Calumet Ave., Chicago, Ill.



Black Diamond Recoil Pad

Improved Athletic Shoe for Women

WOMEN in sports often find the change from their high-heeled street footwear to flat "gym" or tennis shoes a rather painful strain. In consequence, the Servus Rubber Co., Rock Island, Ill., for the past six months in conjunction with Dr. Forrest C. (Phog) Allen, director of athletics at the University of Kansas, has been working on a canvas top, rubber soled shoe which would actually give comfort, perfect fit, and proper protection to the feet of the average woman and girl who participates in athletics or sports indoors or out. This shoe has been thoroughly tested and proved satisfactory. Its details may be noted in the accompanying illustration.

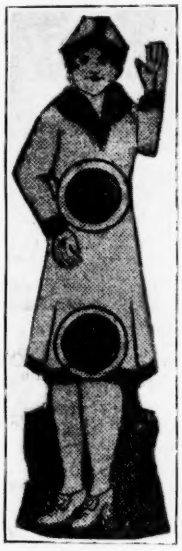


The shoe upper is of good quality white duck with white trimming and foxing. For protection it boasts white stubber toe guards and white toe cap. The sole is of tough yet pliable red compound gum rubber. The heel is narrow and snug fitting with thick sponge rubber cushion heel seat that raises the wearer's heel high enough to practically eliminate the strain that affects the nerves, tendon, and leg muscles when changing from high heels

to the ordinary flat tennis shoes. The arch is also snug fitting and has an inner built cushion rubber arch support, which means that the feet cannot tire or the arches sag. The shoe is loose-lined and the lining is seamless, giving a glove-like fit which assures comfort to even the most tender feet.

Rubber "Safety Lady" Kidnaped

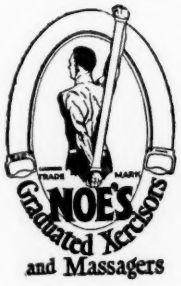
Detroit police recently spent a night hunting for a rubber "safety lady" who had been kidnaped, only to find her lying damaged on the City Hall steps in the morning. The figure, quite life-size, fashioned of vulcanized rubber, and painted to resemble a woman in street garb, had been installed as a warning device in an unprotected safety zone. After it had been spirited away, another figure of the same kind was put in its place, but instead of bouncing back when struck by a careless motorist, she lay helpless. Both ladies were repaired at the police shop and were on duty next day. Many such figures are being used and they are said to be quite effective in regulating traffic.



Rubber Traffic Signal

Noe's "Xercisors"

NOE'S "Xercisor" is a graduated exercising device of an extremely simple, yet effective type. Three adjustable rubbers of various weights are supplied, together with a pair of aluminum detachable handles. The user starts with the lightest of the rubbers and uses the other two, which are heavier, as his ability increases. The changes can be made instantly without fussing with screws, because of the improved featherweight handle. The outfit weighs but one pound and may easily be carried about when traveling.



The rubbers are made of a specially compounded rubber strip stock, meeting exacting requirements as to tensile strength, elasticity, toughness, elongation, and wearing qualities. The "Xercisor" is made in three separate types: for men, women, and children. For highly developed muscular strength, there are two additional weights, the Sampson and the Super-Sampson, which are furnished on request as extra equipment.

This exerciser and reducer was invented and patented by Roy H. Noe, 90 S. Second St., Memphis, Tenn., who transformed himself from invalidism to health by its use.

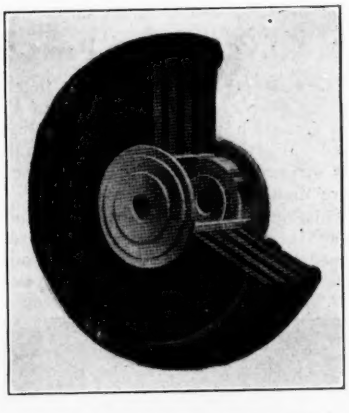
Modernistic New Balloon For Children

AS long as children delight in toys, balloons will prove popular. And, of course, the balloon that is different will always go over big. Such a one is here illustrated. This new toy balloon, decorated with a variegated design in modernistic manner, is offered by The Oak Rubber Co., Ravenna, O., and is named Sunny Sam. It is made in both round and airship style. Its striking colors are sure to catch the eye and cause the kids to cry, "Mama, I wanna balloon."

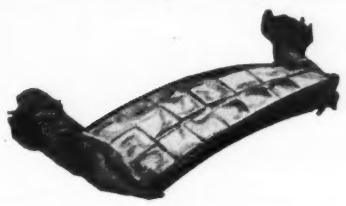
Sunny Sam

Rubwood Wheel

THE Rubwood wheel, here pictured, offers as much floor protection as a soft rubber-tired wheel, yet the former is far more durable. It is made up of laminations of wood ends vulcanized together under heavy compression with good live rubber. This wheel is supplied in two types, plain bearing and ball-bearing. The hub of the ball-bearing type is made up of two circles of steel balls, one at either end rolling in hardened steel races. This wheel may be had with plain axles or with ball-bearing axles. Angle Steel Stool Co., Plainwell, Mich.



Cut-out of Ball-bearing Rubwood Wheel



The Flexotray

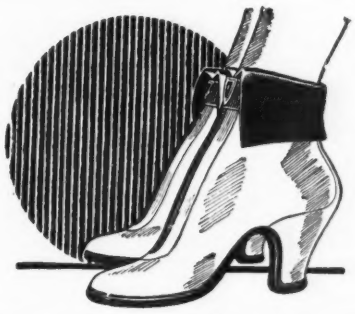
Rubber for the Ice-Box

MOST assuredly this is the age of electricity—when even the prosaic ice-box succumbs. Nor are the advantages of rubber neglected in utilizing electricity. For the Kelvinator Sales Corp., Detroit, Mich., specialist in electric refrigeration, has included in the equipment of its domestic cabinets as an added feature the Flexotray, a rubber ice tray that replaces one of the metal grids in the Kelvinator. These Flexotrays are made of high grade, pure rubber.

This rubber tray makes it possible to remove the cubes by merely twisting the rubber grid so that every cube will fall out instantly; and on the other hand, if only one cube is desired, it can be removed from this rubber tray without disturbing the other cubes. As a further advantage, these rubber trays can be used to store additional ice cubes as a reserve in case of a party, when additional cubes are desired.

Nautical Blue Overshoe

A LOVELY, shimmering gem of color—an overshoe in blue. Blue has become a staple color in footwear, and nautical blue is the season's smartest hue; hence its use even in overshoes. This glove-like and slenderizing all-rubber shoe-protection clings snugly to shapely ankles, making them trim and neat looking. The featherweight moire rubber with its fancy elastic lining is washable inside and out. This ultra-modern galosh is made even more attractive by the concealed talon hookless fastener with its distinctive buckle and strap. The modish cuff may be used for hose protection. The smart heel effect aids also in adding a note of style to stormy-day outfits. The Miller Rubber Co. of N. Y., Akron, O.



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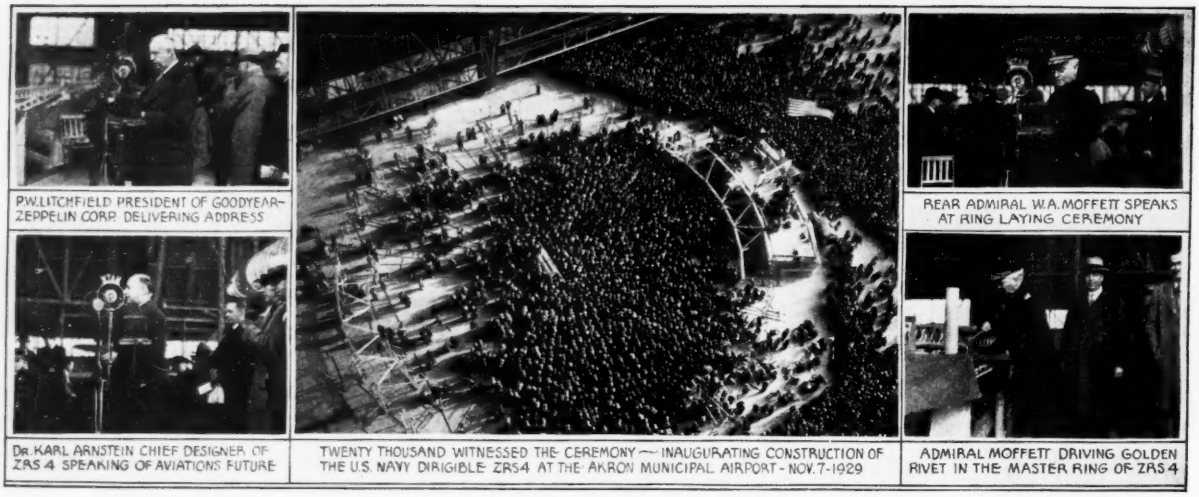

P.W. LITCHFIELD PRESIDENT OF GOODYEAR-ZEPPELIN CORP. DELIVERING ADDRESS
REAR ADMIRAL W.A. MOFFETT SPEAKS AT RING LAYING CEREMONY
DR. KARL ARNSTEIN CHIEF DESIGNER OF ZRS-4 SPEAKING OF AVIATIONS FUTURE
TWENTY THOUSAND WITNESSED THE CEREMONY — INAUGURATING CONSTRUCTION OF THE U.S. NAVY DIRIGIBLE ZRS4 AT THE AKRON MUNICIPAL AIRPORT - NOV. 7-1929
ADMIRAL MOFFETT DRIVING GOLDEN RIVET IN THE MASTER RING OF ZRS 4

Aviation

Laud Litchfield and Seiberling

Rubber Industry Captains Hailed at Akron Zeppelin Celebration as Foremost in Nation's Dirigible Development

"Paul W. Litchfield, more than any other man in this country, is responsible for the progress and strides of this lighter-than-air transportation, and today's event is but the practical realization of this one man's dream," said Rear Admiral William A. Moffet, U. S. N., at a banquet on November 7, following the master-ring laying ceremony at the Goodyear-Zeppelin Corp. airport in Akron, O., which was attended by one of the most distinguished groups ever assembled in the state, including national legislators, representatives of the Executive Cabinet, chiefs of great industrial corporations, heads of Army and Navy divisions, world-famous aeronauts, and many who have in a substantial way aided the development of aviation in America.

Modestly disclaiming the credit heaped upon him by many speakers for his vision and enterprise in the promotion of air navigation by means of the dirigible balloon, Mr. Litchfield, president of the Goodyear-Zeppelin Corp., who was toastmaster, turning to F. A. Seiberling, head of the rubber company bearing his name, said:

"Just eighteen years ago an Akron man had the vision to conceive of an airship that could cross the ocean, and though the venture failed, we can only look back upon it as the logical beginning of the enterprise before us today. I would like Mr. Seiberling to stand."

Among the speakers were Major Clarence Young, assistant secretary of aeronautics, United States Department of Commerce; Commander C. E. Rosendahl, U. S. N.; Congressman W. B. Oliver; W. Irving Glover, assistant postmaster general; and W. P. McCracken, former assistant secretary of commerce in charge of aviation. The governors of Ohio, Florida, and Mississippi wrote congratulations to Mr. Litchfield and the Goodyear-Zeppelin company.

The ring-laying at the gigantic hangar was witnessed by 20,000 people. A golden rivet was driven by Rear Admiral Moffett into the key unit of the master ring, which in turn becomes the key piece of the immense metal skeleton for the first of the two super-zeppelins which will be built in Akron for the United States Navy. When these are finished, the company will build two still larger dirigibles of the same type for commercial service between the Pacific Coast and the Hawaiian Islands.

The General Tire & Rubber Co., Akron, O., pilots of its "Sky Fleet," as they neared the end of their 20,000-mile air tour over the United States, made a pilgrimage to the research laboratory of Orville Wright, "Father of Aviation," in Dayton, O. Mr. Wright congratulated the young fliers on having conducted their tour without serious accident, and he also expressed his approval of the efforts being made by the General company to perfect new safety devices for installation on airplanes.

Pants Speed Plane

Pants are the latest addition to the landing gear of airplanes. Tests of the new Goodrich test plane No. 3, christened "Miss Silvertown," show that the new streamline pants increased its speed more than six miles an hour.

This innovation in airplane equipment, shown in the illustration, was designed by engineers of The B. F. Goodrich Co., Akron, O., and during tests made in working out the best equipment to lessen wind resistance, valuable data was given the aeronautical industry with respect to the comparison of smooth and non-skid tires on landing wheels. The streamline idea on airplane wheels was introduced by Goodrich and used by Colonel Lindbergh on his famous "Spirit of St. Louis" during his epic trans-Atlantic achievement.

Wing-like Device Over Wheels Is the New Streamline Pants

Editor's Book Table

Book Reviews

"A. S. T. M. Tentative Standards 1929," American Society for Testing Materials, 1318 Spruce St., Philadelphia, Pa. Paper or cloth, 901 pages, 6 by 9 inches. Indexed, illustrated.

This volume just off the press contains the following Tentative Standards relating to rubber—twenty-five standards for rubber products, insulating materials, and textile materials.

Annual Report (1928) Including Initial Period. Published by the Rubber Research Institute of Malaya. Paper, 6⅛ by 9¾ inches, 128 pages.

The Rubber Research Institute was established in September, 1926, with Dr. Bryce as director. About a year ago severe criticism was directed against him and his work, culminating in the termination of his contract with the Institute. His report of the Institute's activities furnishes interesting material.

During the period November, 1926—December, 1928, 304 visits were paid to 250 estates, experiments were conducted on 42 estates, 49 lectures were delivered before various planting associations and other organizations by the director and his staff, and no fewer than 2,909 letters from planters on the most varying problems of rubber planting were handled. The different departments investigated a number of special problems as budding and the physiology of latex production, manufacturing crepe and sheet, and concentration of latex, combating pests and diseases, etc.

"Some Properties of Sponge Rubber." Circular of the Bureau of Standards, No. 377. U. S. Government Printing Office, Washington, D. C. 1929. Paper, 8 pages, 6 by 9 inches. Illustrations, tables, graphs.

This bulletin gives general information on soft sponge rubber as commercially manufactured, and furnishes data on the physical properties of thirteen different samples of sheet material.

"Hand-to-Mouth Buying." By Leverett S. Lyon. The Brookings Institution, 1929, Washington, D. C.

This volume was chosen by The Business Book League as the outstanding business book of December, 1929. Quoting from the Director's preface, "This study takes the business man's phrase 'hand-to-mouth buying' and interprets it in terms of both the business and the economic issues involved. On the basis of a great mass of statistics, it undertakes a measurement of the changes which have been going on, and of their actual significance in the organization of production and distribution of goods."

A major portion of the book deals with the "effects and concomitants" of hand-to-mouth buying. The final division of the book is devoted to the question of the permanency of such buying. The volume is most timely and helpful to all who are concerned with problems of trade, business stabilization, and economics generally.

New Publications

"Biggs Vulcanizers and Devulcanizers." The Biggs Boiler Works Co., Akron, O. An 8-page profusely illustrated folder descriptive of the many types of rubber curing and reclaiming steam apparatus.

"Wellington Heavy Duty Rubber Tired Wheels, Catalog No. 5." The Wellington Machine Co., Wellington, O. Describes rubber tired wheels, casters, trucks, and wheelbarrows for rubber factories and other industrial services.

"Two Years' Experience with Certified Carbon Black." By C. R. Johnson, technical director of Godfrey L. Cabot, Inc., Boston, Mass. Many facts of interest to the purchasing agents and technical staffs of the rubber industry are recounted, and the reader is informed how certified carbon black was developed and is under constant laboratory control by special tests greatly to the advantage of its technical quality. Interesting charts of carbon black consumption are given, which exhibit the increase in this company's production. A valuable tabulation of physical tests on good, medium, and poor quality carbon blacks with various accelerators will prove of much interest and value to rubber chemists and compounders.

"The Natural Coagulation of Hevea Latex," by A. S. Corbet. Published in September, 1929, by the Rubber Research Institute of Malaya. The first of a series to be issued at intervals when specific scientific or technical investigations have been completed for publication.

"Cotton from Plant to Product" comes from the Pepperell Mfg. Co., 160 State St., Boston, Mass. This fascinating booklet was issued in compliance with many requests, especially from school children. Thus, the company offers it "only as an every-day treatise on how cotton grows and what happens to it after it has been picked in the fields." But it will prove a valuable and interesting source of information to any one concerned with the question of cotton. In story-book form, with many historical references, the development of the various phases of the cotton industry is entertainingly written and profusely illustrated. Paper, 68 pages, 6 by 9 inches.

"The Crepe Rubber Sole (Plantation Finished) Handbook for Repairers." This 20-page illustrated booklet is issued by The Rubber Growers' Association, Inc., 2 Idol Lane, Eastcheap, London, E. C. 3, England. It contains full and explicit directions on the procedure for repairing leather shoes with crepe soles and heels. Every step is pictured as well as described, and the instructions cannot fail to be of service to shoe repair men wherever crepe soling is available.

"Annual Report and Year Book, 1928-1929," has been issued by the Planters' Association of Malaya, Inc., Kuala Lumpur, Federated Malay States. This book contains the report of the association for the year ended March 31, 1929. It gives also information on Indian, Chinese, and Netherlands Indian labor, health boards and game laws, as well as on cocoanuts and copra. To rubber are devoted two chapters, one on rubber itself and the other on diseases and pests of *Hevea*, cover plants, manuring, budgrafting and seed selections, etc. The book concludes with miscellaneous notes and appendices. It provides a wealth of data regarding Malaya, supplemented by statistics and tables. 5⅞ by 8⅜ inches, cardboard covers, 198 pages.

"Foreign Markets for Rubber Boots and Shoes and Rubber Heels and Soles, Section III, Latin American Countries," is a 44-page paper booklet issued under the supervision of E. G. Holt, Chief, Rubber Division, Department of Commerce, Washington, D. C. The preface by Mr. Holt gives a brief résumé of the situation. Then, in tabular form, with separate pages devoted to each of the twenty Latin American countries considered, are given statistics on foreign imports and exports as well as their value of rubber boots and shoes and rubber heels and soles.

Obituary

Eminent German Rubber Technologist

A WELL-KNOWN pioneer of German rubber research, Dr. Eduard Marckwald, died on September 28, 1929, after a severe and long illness. He had almost completed his sixtieth year. For the last twenty-nine years he had in collaboration with Dr. Fritz Frank continued and developed the Chemical Laboratory for Trade and Industry, founded by Dr. Robert Henriques, the first enterprise devoted to the scientific and analytical investigation of rubber.

At the beginning of his career, before he took over the Henriques practice, Dr. Marckwald had devoted himself to inorganic problems and later took up rubber. After he had joined the Laboratory, about 1900, he devoted himself enthusiastically to

Dr. Eduard Marckwald

rubber problems. He had need of his enthusiasm and his great capacity for hard work, for the laboratory had not prospered after the death of Dr. Henriques and it had practically to be rebuilt. At first he collaborated with an assistant of Dr. Henriques, then with a friend, Dr. M. Stange, and finally he met Dr. Fritz Frank and soon the two cooperated, working zealously and harmoniously on problems of rubber technology and analysis. A little scientific work was also carried out on the side, but the demands of the laboratory did not allow much time for purely scientific pursuits. However, the strenuous and incessant labors of the two were rewarded; the laboratory became a success and was soon expanded to include also coal, tar, and oil problems.

Dr. Marckwald traveled extensively and came in touch with the African rubber plantations for which he and Dr. Frank later directed the Colonial Rubber Center. In the course of his African travels a species of Euphorbia was discovered which now bears his name—*Euphorbiacea Marckwaldi.*

The results of the investigations carried out by Drs. Marckwald and Frank have been published in numerous articles appearing in leading trade journals. The deceased leaves a reputation which will long survive him.

William H. Schlosser

WILLIAM HENRY SCHLOSSER, former assistant superintendent of the Woonsocket Rubber Co. of the United States Rubber Co., Woonsocket, R. I., and brother of George Schlosser, former general manager of the boot department of the United States Rubber Co., died on November 2 at the Woonsocket Hospital after an illness of more than five months. Mr. Schlosser had retired from the rubber business about six months ago.

He was born in Milltown, N. J., on July 20, 1869. He was educated in the public schools in Milltown and there began his career in the rubber industry. He worked for rubber companies in Indiana and Bristol, coming to Woonsocket twenty-seven years ago as foreman of the calender rooms. He became assistant manager of the mill shortly afterwards.

He is survived by his widow, a daughter, a brother, a sister, and two nephews.

He was a communicant of the St. James Episcopal Church, Woonsocket, and a member of the Woonsocket Lodge, No. 850, B. P. O. Elks, Woonsocket Lodge, Royal Order of Moose, and Winona Council, No. 1, Junior Order of United American Mechanics.

The funeral was held on November 5 from his home. The body was sent the next day to New Brunswick, N. J., for burial.

Joseph M. Condon

JOSEPH M. CONDON, employed for twenty-six years by the Murray Rubber Co., Trenton, N. J., and for many years superintendent of the tube room, died at the McKinley Hospital, Trenton, recently after a lingering illness. His wife and one sister survive him.

Austrian Rubber Executive

THE Commercial Councillor, Ludwig Reithoffer, vice president of the Gummi-und Kabelwerke Josef Reithoffers Söhne A.G., Vienna-Steyr, died on October 20, 1929. He was born on April 10, 1866, a descendant of an ancient patrician Austrian family prominent in the rubber industry. His ancestor, Johann Nepomuk Reithoffer, was among the first Europeans of a century ago to utilize rubber for various purposes. The business has been handed down from father to son, and when Ludwig Reithoffer ended his schooling, he quite naturally was trained in this work.

Besides being vice president of that firm, he was also on the board of directors of the Semperit concern in Austria, of the Vereinigte Gummiwarenfabriken Wimpassing, vormals Menier-J. N. Reithoffer, and of the Berson-Palma Kautschuk G.m.b.H. He was, furthermore, president of the Vienna Automobile Club.

He leaves a son, Hanns Reithoffer, who has been a managing director of the Gummi-und Kabelwerke Josef Reithoffers Söhne since 1922.

Renowned Colloid Chemist of Germany

NEWS has been received of the death in his sixty-fourth year of Dr. Richard Zsigmondy, professor of inorganic chemistry at the University of Gottingen. Dr. Zsigmondy is probably best known in connection with colloid chemistry for the

Dr. Richard Zsigmondy

development of which he was largely responsible. The ultra-microscope, the colloid chemist's most important instrument, is also his work. In collaboration with Henry Siedentopf he designed the delicate instrument. He left several scientific works, and his volumes on colloid chemistry and ultra-microscopy are of great importance. Rubber chemistry, too, is indebted to him, particularly for his numerous new observations in colloid chemistry.

David Brown

DAVID BROWN, 77, at one time superintendent of the Turner-Vaughn-Taylor Co., now the Vaughn Machine Co., Cuyahoga Falls, O., died recently at his home at 328 S. Second St., Cuyahoga Falls. Death was due to infirmities.

He was a machinist and designer of machinery and was employed by The B. F. Goodrich Co., Akron, O., for a number of years, being retired on pension about seven years ago. He was a member of the Fifty-Year Club.

He leaves three sons, a daughter, and a sister.

Funeral services were held at the Weller Funeral Home. Burial was at Oakwood Cemetery.

M. & E. A. at Automobile Shows

Approximately one hundred manufacturers of automotive parts, accessories, and garage repair equipment, members of the Motor & Equipment Association, have been assigned space at the National Automobile Shows which will be held in New York, N. Y., January 4-11, 1930, and at Chicago, Ill., January 25 to February 1, 1930.

The Rubber Industry in America

OHIO

The Inland Manufacturing Co., Dayton, O., a division of the General Motors Corp., has promoted George M. Rowland to the position of technical superintendent of the rubber department. Before coming to the Inland company Mr. Rowland was with The Goodyear Tire & Rubber Co., Akron, O., in several capacities for fourteen years. He has been with Inland for one year, in charge of the control laboratory in factory production.

The Pretty-Scheffer Rubber Co., Carrollton, O., has reported heavy losses resulting from a fire in its factory leased from The Tuscan Tire & Rubber Co. The cause of the fire is attributed to the bursting of an electric light lamp near one of the tanks, igniting the naphtha gases which had gathered in the atmosphere. The rubber company has made no definite plans as yet. If the Tuscan plant is rebuilt, it will continue operations under its present lease. If not, The Pretty-Scheffer Rubber Co. will either build or buy a factory and continue to manufacture rubber gloves, bathing caps, water bottles, finger cots, and kindred items all by the dipped process. Its loss was in excess of $14,000, consisting of materials, equipment, and stock, covered by $10,000 insurance. The Tuscan company's loss, building only, is placed at $150,000, but no insurance was carried.

The Hirsch Tire & Rubber Co., Cleveland, O., has opened in Akron, O., a branch known as the Roundhouse Salvage Co., in charge of D. H. Hirsch, of the parent concern. The branch organization will deal in scrap metals, tires, tubes, radiators, and batteries. Employment will be given to ten to twelve workers.

The Aetna Rubber Co., Ashtabula, O., has announced the resignation of H. J. Kappler as vice president and factory manager. He is not severing his connection with the company but in future will concentrate his activities on the engineering development of equipment and production. His former duties will be divided among the various heads of divisions of the present organization.

Chamber of Commerce, Akron, O. The speakers for the 22nd annual meeting held on November 20 were Clifton Slusser, vice president and factory manager of The Goodyear Tire & Rubber Co.; T. G. Graham, vice president, The B. F. Goodrich Co.; J. W. Thomas, vice president, Firestone Tire & Rubber Co.; C. W. Seiberling, vice president, Seiberling Rubber Co.; W. E. Fouse, vice president, The General Tire & Rubber Co.

At the business meeting immediately following the dinner eight trustees were chosen from sixteen candidates. Included in the candidates were: Charles J. Jahant, vice president, The General Tire & Rubber Co.; Victor I. Montenyohl, treasurer, The B. F. Goodrich Co.; B. M. Robinson, assistant secretary, Firestone Tire & Rubber Co.. Included in the eight trustees held over for another year are Stanley H. Harris, president, Akron Rubber Mold & Machine Co., and C. E. Slusser, Goodyear vice president. The trustees whose two-year term expired included H. S. Firestone, Jr., president, Firestone Plantations Co; Wm. O'Neil, president, The General Tire & Rubber Co.; Wm. Pfeiffer, president, Miller Rubber Co.; and James D. Tew, president, The B. F. Goodrich Co.

The Republic Rubber Co., Youngstown, O., has announced the advancement of H. P. Schultz to the position of traveling sales manager. He came to Republic in 1922 to establish a production control and planning department, which he managed until he was transferred to sales in October, 1925, as special field representative. In his new capacity Mr. Schultz will act as personal field representative to O. S. Dollison, vice president in direct charge of sales.

H. P. Schultz

The Swinehart Tire & Rubber Co., Akron, O. Robert Guinther, of the law firm of Slabaugh, Seiberling, Huber & Guinther, was named trustee of the Swinehart Tire & Rubber Co. at the meeting of creditors held on October 30. This appointment opens the way for settlement of the bankruptcy action started against the Swinehart company in federal court some time ago. Guinther as trustee will handle the claims and accounts of the rubber company until its affairs have been adjusted and a final accounting is approved by federal court.

J. C. Clinefelter, 305 Metropolitan Bldg., Akron, O., has been appointed Akron representative of the Nagle Machine Co., Erie, Pa., maker of rubber working machinery.

S. F. LaChance, general credit manager for The Dayton Rubber Mfg. Co., Dayton, O., who has just returned from a two months' trip visiting Dayton dealers on the Coast, declares: "I am much impressed with the spirit of 'push' manifested by our west coast distributers, and it looks like we will treble our volume in this section within the next twelve months."

Mr. LaChance says credit and collections are very good with his company and that industrial and fan belt sales are unusually high, The Dayton Rubber Mfg. Co. supplying approximately 85 per cent of the original equipment on fan belts.

R. M. Bowman has recently left Akron, O., for the Far East to establish distributing depots for The General Tire & Rubber Co.'s products in Japan, China, the Philippines, and India. Mr. Bowman believes that aeronautic development in the Orient, except by Japan, has not yet scratched the surface, but the market for American-made automobile tires is rapidly increasing and British competition is on the way out.

Earl E. Humphrey, in charge of the direct mail sales promotion of the Miller Rubber Co., Akron, O., has been elected president of the Advertising Club of Akron.

The Rubber Service Laboratories Co., Akron, O., has announced the appointment of R. L. Sibley in charge of research and development to fill the vacancy caused by the resignation of C. Olin North. Mr. Sibley is not only an experienced chemist but has complete knowledge of rubber compounding. He is also a patent lawyer and expects soon to take the Bar examinations. He has taught rubber chemistry at the University of Akron.

The company announces also that Arnold H. Smith, for seven years in its employ, is being sent to England to call on European rubber companies. He will be located in the London office of Monsanto Chemical Works, St. Louis, Mo., with which the Akron concern recently was merged, and he will cooperate in the foreign sales of its materials with Binney & Smith, its foreign sales representative.

With the exception of Mr. North's resignation, The Rubber Service Laboratories Co. states that the rest of its personnel will remain intact.

F. A. Seiberling Speaks of Rubber Necessity at Tire Dealers' Meeting

"Visualize, if you will," he said, "the elimination or rather the magical destruction of every ounce of rubber in use at midnight tonight. What would be the result? Not a wheel would turn in any factory tomorrow; not a single street car, railroad car, or automobile would operate; not one electric light would burn; not a drop of water or a foot of gas would go through your city mains; and the baby relying upon nourishment through the rubber nipple would scream for relief.

"Social life would be in chaos until a readjustment could be made. That, my friends, is the importance of rubber to our modern life."

Goodrich Activities

James D. Tew, president of The B. F. Goodrich Co., Akron, O., was one of the speakers at the First Ohio Management conference held at Columbus on November 20. Mr. Tew's topic was "The Manufacturer's Responsibility to His Dealers."

President Tew and directors of The B. F. Goodrich Co., as well as city officials, welcomed home the Goodrich Silver Fleet, which arrived in Akron on November 6. A parade, a luncheon, and a banquet were some of the honors accorded the nineteen pilots and their commander, H. R. Schaeffer. Each pilot was presented with a belt having a silver initialed buckle. All of the pilots have accepted positions in various branches of Goodrich.

During the last nine months, the fleet, made up of fifteen cars, has visited more than two hundred major cities in forty-five states. Thirty thousand miles of all sorts of roads were covered. The Goodrich company says that thirty-two stock tires used on cars in the fleet completed the trip.

After the regular quarterly meeting of the board of directors of The B. F. Goodrich Co., held on November 6, the following statement was released. For the nine months' period ended September 30, 1929, sales both in tonnage and dollars and profits showed a substantial increase over the corresponding period of last year.

The regular dividend of $1.75 per share was declared on the preferred stock payable on January 2, 1930, to stockholders of record at the close of business on December 10, 1929. A dividend of $1 per share was declared on the common stock without par value payable on December 2, 1929, to stockholders of record at the close of business on November 18, 1929.

W. W. Martin, director general of the French B. F. Goodrich Co., Mrs. Martin, and George M. Madole, superintendent of the French Goodrich factory, sailed Nov. 8 on the "Ile de France." Mr. Martin and Mr. Madole came to Akron to attend the meeting of the board of directors of The B. F. Goodrich Co.

Firestone Operations

Harvey Firestone, president of the Firestone Tire & Rubber Co., Akron, O., played host at his Akron home last month to Firestone branch managers and special representatives in the United States and abroad. The annual sales conference of the company had brought the men together to learn plans for 1930 business.

Harvey S. Firestone, Jr., vice president of the Firestone Tire & Rubber Co., accompanied by Mrs. Firestone, also Samuel Broers, vice president of the Firestone Export Corp., and E. A. Hoener, chief engineer, sailed from New York on November 8 on the "Ile de France" for England. The Firestone executives will inspect the recently enlarged Firestone factory at Brentford, near London, and will study plans for additional expansion, for the Firestone English plant has been forging ahead steadily ever since the plant was completed about a year ago. Mr. Firestone and Mr. Broers will also visit the various Firestone continental distributers and the entire party is expected to return to the United States about the middle of December.

J. J. Harney, Fabric Department of the Firestone Tire & Rubber Co., recently returned to the Akron plant from the cotton mills at Brentford, England. His stay in America, however, was very short.

Samuel Y. Symms, civil engineer at the University of Akron, Akron, O., left on November 20 for Liberia in the interest of the Firestone Tire & Rubber Co. plantations. Warren Brockett and Ross Wilson, former Akron University students, have been in Liberia for the past three years.

Huge Rubber Cargo

The largest shipment of crude rubber ever brought to Akron, O., over the water-motor-truck route from Cleveland was delivered to The Goodyear Tire & Rubber Co. recently. A fleet of fifty tractors and trailers was employed to haul the 475-ton shipment from the docks in Cleveland to the factory in Akron.

The rubber came from Sumatra by boat through the Panama Canal, up the coast to the St. Lawrence River and was transferred to a lake boat at the Welland Canal. The lake boat carried the rubber to Cleveland docks where the trucks loaded.

Jack Smith, of the Hayden quartet, Akron, O., radio favorites, is superintendent of the Eclat Rubber Co., Cuyahoga Falls, O. Another of the popular singers, Albert Thomas, is with the Firestone Tire & Rubber Co., Akron.

Goodyear Argentina Factory

Paul W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, O., returned to Akron on October 29 after a two-month visit to South America, where he inspected possible sites for a Goodyear tire factory. No definite decision was reached.

In the Argentine, President Litchfield encountered a curious internal tax situation that threatens to delay construction of a branch tire factory there. It appears that a feasible location for a plant was discovered in a province close to Buenos Aires, but outside of the metropolitan area of Buenos Aires, the provinces impose an excise tax.

"If, at the next session of the Argentine congress, this objectionable legislation is removed or modified, it is probable that Goodyear will immediately announce selection of a site for its South American plant. . . . Argentina is, of course, the ideal place for a tire factory, having as it does in excess of 400,000 automobiles registered," declared Mr. Litchfield.

Stock Crash Will Benefit Replacement Tire Business

Replacement tire business is bound to benefit by the recent general liquidation of stocks and the slump in stock prices, it was asserted by W. O'Neil, president of The General Tire & Rubber Co., Akron, O., which does not seek original equipment tire business, in commenting on the present financial situation.

"For the next month, it probably will slow down business a little and may slow down collections, but within the next twelve months it is going to help the replacement tire business very materially," he said.

"There will not be quite so many new cars purchased; therefore the replacement sale on tires will be larger. Rubber Association reports for the past fifteen years show that whenever there is an abnormal gain in the sale of new cars, the sales of tires to dealers does not increase so rapidly as in a year when there are not quite so many cars sold.

"In the first six months of this year, a million more new cars were sold than in the same period last year. This removed from the replacement market hundreds of thousands of persons who had practically run the mileage out of the tires which came on the cars when they were new. They were just about ready to buy replacement tires but, instead, they bought new cars."

NEW ENGLAND

William D. Ahearn, for six years a salesman in western Massachusetts for The Goodyear Tire & Rubber Co., Akron, O., and more recently for Batchelder & Snyder, Boston, has become vice president of the Davies General Tire Co., Springfield, Mass. Early last month Mr. Ahearn visited the Buffalo branch and the Akron plant of The General Tire & Rubber Co.

J. W. Whitehead, president of The Norwalk Tire & Rubber Co., Norwalk, Conn., has issued a statement in which he declares that cooperative buying is the need of independent dealers, especially if they are to meet successfully the competition of mail-order houses, chain stores, and factory operated outlets.

J. W. Whitehead

The Hood Rubber Co., Watertown, and the **Avon Sole Co.,** Avon, both in Mass., displayed their wares at the fourth annual exhibit of quality products of the Associated Industries of Massachusetts held in Boston recently. Hood featured the number of rubber products turned out at the one factory in Watertown; while Avon showed its new Du-Flex rubber soles for shoes.

The B. F. Goodrich Rubber Co., Akron, O., has taken a long-term lease on the three-story and basement fireproof building at 109 Brookline Ave., Boston, Mass., where it will maintain its New England headquarters. Alterations are now going on that will include another elevator, a spiral-shute, new office arrangement, and other changes to fit the needs of the rubber and footwear branches.

The Firestone Tire & Rubber Co. From New Bedford, Mass., comes the information that the general offices of the Firestone company are to be located here in the future. At Newburyport, Mass., the old mill of the Dwight Manufacturing Co., recently acquired by Firestone, is now operating full time both day and night.

C. B. Whittelsey, for many years in charge of the United States Rubber Co.'s factory in Hartford, Conn., was placed on the retired list on November 1, 1929. In the future he will be executive vice president of the Hartford Chamber of Commerce.

T. M. Knowland, development engineer, formerly with Hood Rubber Co. Watertown, Mass., is now affiliated with Boston Woven Hose & Rubber Co., Cambridge, Mass.

Carl K. Wolfe has been appointed sales and advertising manager of the Norwalk Tire & Rubber Co., Norwalk, Conn. He was formerly a member of the sales staff.

National India Rubber Co., Bristol, R. I. Thirty employes of the machine shop honored Samuel Brelsford, their former foreman, who had resigned recently after forty-two years of service with the company, at a banquet in the Colonial Hotel, Bristol. Mr. Brelsford was presented with a smoking set.

The United States Rubber Co., will remove the Chelsea, Mass., plant within the next six months to the Providence plant of that corporation, according to announcements made during the past month. The transfer will involve the removal of about 500 families from Chelsea to Providence, as upwards of 1,000 hands are employed at the Chelsea plant. The latter is a unit of the sundries department of the United States Rubber Co., and also manufactures rubber flooring, soles, and heels. Officials of the corporation are said to believe that the sundries department, of which Harlow W. Waite is general manager, with headquarters in Providence, is the fastest growing division and holds forth great possibilities for future expansion. Management of this department is centered and will continue to be located at Providence, where considerable expansion has already been accomplished.

Tire Stocks in the Stock Market Collapse

The price record of common stocks of rubber tire companies before and after the collapse of the New York stock market in October is tabulated below. The decline in price of the stocks of eleven well-known tire companies is given both in dollars and by percentage. The latter figures show that practically half of these stocks declined in price an average of 82 per cent below their highest level. Since the collapse the prices on all of these stocks have reacted upward.

PRICE RANGE OF TIRE COMMON STOCKS
1929

Company	High	Low	Net Decrease Dollars	Net Decrease Per Cent
Ajax	11¼	2	9¼	82
Firestone	244	170	74	30
Fisk	20⅛	3½	16⅝	82½
Goodrich	105¾	42	63¾	60
Goodyear	154½	60	94½	61
Kelly-Springfield	24	3⅞	20⅛	84
Lee	25	5	20	80
Miller	28⅞	5⅛	23¾	82½
Mohawk	20	15	5	25
Seiberling	24	15	9	33
United States	65	15	15	77

Perfect Radically New Principle of Tire Building

The perfection of a new principle of automobile tire design known as the Fisk Air-Flight Principle was announced on November 14 by H. T. Dunn, president of The Fisk Tire Co., Inc., Chicopee Falls, Mass. The new air-flight tires are the result of several years' experiment and research by Fisk tire engineers and technicians.

"This is the first progressive step in tire building since the development of the balloon tire," Mr. Dunn said. "The Air-Flight Principle, in brief, means that the air in the tire carries the load of the automobile and transmits the power of the engine to the road to a much greater extent than in balloon or high-pressure tires."

Production of air-flight tires has already started, and orders from dealers are being received from all parts of the country. The new principle is believed to be as important and as revolutionary as was the introduction of the balloon tire several years ago.

Public-Merchandise Warehousing

Seventy-four and four-tenths per cent of the space devoted to general storage in public warehouses was occupied by merchandise at the end of September, as reported to the Department of Commerce by 536 concerns operating 1,222 warehouses, as compared with 71.9 per cent at the end of August. This summary presents for each of the important states and for the New York metropolitan district a statement of the space conditions and incoming tonnage of identical public-merchandise warehouses for August and September.

Legal

PROCESS AND APPARATUS FOR CORD TIRE MANUFACTURE. The Court of Customs and Patent Appeals has upheld the action of the Patent Office in refusing a claim for a process and apparatus for incorporating cords in rubber sheets, which claim appears in application No. 2,119 of Thomas Midgley.

The method claimed by the applicant and that outlined in the Marquette patent, No. 1,321,223 issued Nov. 11, 1919, for a similar article were held to be practically the same and to obtain similar results.

EX PARTE WILLIAM C. GEER AND HARRY L. FISHER. Patent Office Board of Appeals. Appeal No. 1,103. Patent No. 1,731,485 was issued Oct. 15, 1929, to William C. Geer and Harry L. Fisher for rubber composition and method, on Serial No. 714,734, filed May 20, 1924.

The decision was rendered in this case that all definite claims in a patent application for a rubber composition and methods for producing it are patentable, while indefinite claims are not. The Board of Appeals prescribed at length the tests to be applied in determining whether to allow claims with broad generic terms for chemical classes or materials, as follows: "The rule that in chemical cases it is not permissible to allow broad claims covering a large field of chemicals, or materials, when the applicant has disclosed only one example or a very limited part of the field is based, according to the opinion, upon a reason analogous to that for disallowing claims for the exclusive use of a principle of nature."

The rejection is affirmed as to claims 3, 5, 7, and 9 of the above mentioned patent under this decision.

N. T. D. Convention

The Tenth Annual Convention of the National Tire Dealers Association was held in Chicago, Ill., November 11-14. The feature of this convention, attended by about five hundred of the outstanding tire retailers of the country, was putting into effect the United Tire Stores Corp. of America, which is planned to become a gigantic cooperative purchasing and brand-tire outlet for the retail trade. It was announced that the United, which was founded last July by the N. T. D. A. and merged during the Chicago convention with the A. T. D. A. Corp., a subsidiary of the Automobile Tire Dealers' League of America, would within three weeks be able to distribute to members a tire of its own brand, which could be priced to meet mail-order competition. One hundred prominent tire dealers have subscribed to the United Tire Stores.

In conjunction with its convention the N. T. D. A. staged an exhibition of tires, accessories, and service-station equipment, which established a record for the industry by the number of participants and the diversity of displays.

NEW JERSEY

Little change has occurred in the rubber industry in New Jersey during the past month. The production of some types of mechanical goods dropped off a little, but this was expected at this season of the year. Other lines continue to be good. Tire production remains normal with prices the same. It was expected, however that Trenton manufacturers would increase prices as was done by some of the larger manufacturers. Orders for heels and soles show no decrease. The same condition prevails in brake lining and hard rubber goods.

Samuel R. Fletcher, Jersey City, N. J., has been appointed equity receiver in the United States District Court for the Rodic Rubber Co., Garwood, N. J. For the last ten months the business is said to have been conducted at a monthly loss of $1,000. The appointment was made by Federal Judge Runyon, who authorized Mr. Fletcher to continue the business. The equity suit was filed by Raymond Healy, White Plains, N. Y., who alleges the company's assets amount to $137,000, with liabilities of $67,750. Besides being a stockholder in the company, Mr. Healy holds an unpaid note for $2,000. It is alleged that the company's net income has been so reduced by intense competition that it has become difficult for it to meet the payroll.

The United States Rubber Co., Passaic, N. J., has let a contract for the erection of a five-story basement building, brick and steel, at 211 Passaic St. to cost $1,000,000.

The rubber company announces also that its main buildings at New Brunswick, N. J., will be sold for $150,000. The chain of buildings contains 150,000 square feet of floor space. The company recently sold a strip of land, 80 by 135 feet, on Albany St. for $50,000 to a gasoline company. Negotiations are under way for the sale of the plant of the India Rubber Co. on Washington St.

J. Edward Myers, superintendent of the Acme Rubber Manufacturing Co., Trenton, N. J., has been appointed leader in the membership drive of the Trenton Y. M. C. A. to secure 2,000 new members.

The Pocono Rubber Cloth Co., Trenton, N. J., reports that business has dropped off a little. But the concern expects conditions to improve during the winter.

The Essex Rubber Co., Trenton, N. J., announces that business in rubber heels and soles is active and that conditions look promising.

H. Monroe Smith, formerly in the development engineering department of the Manhattan Rubber Manufacturing Co., Passaic, N. J., has severed this connection and will start in business under his own name with offices at 625 Main Ave., Passaic. The new concern will manufacture labor saving equipment.

Whitehead Bros. Rubber Co., Trenton, N. J., is operating to capacity in all the departments.

The New Jersey Rubber Co., Lambertville, N. J., manufacturer of reclaimed rubber, reports that business is good. The company experienced a busy summer and fall.

Montgomery, Ward & Co., Chicago, Ill., mail order house, has leased much property at Warren and Hanover Sts., Trenton, N. J., and will convert it into a department store. The company will introduce a new brand of tires in Trenton.

The Luzerne Rubber Co., Trenton, N. J., has let a contract for the erection of a large building to house its commercial machines.

The Murray Rubber Co., Trenton, N. J., has announced organization changes. Ralph W. Stoddard, Grand Rapids, Mich., has been named to look after the company's territory in the Midwest. Mr. Stoddard was formerly connected with the Corduroy Tire Co., Grand Rapids. Edward B. Dolton has resigned to become assistant resident manager of the Trenton branch of a New York brokerage firm. Ray H. Paddock, formerly general sales manager of the Murray Co., is now in charge of opening new chain stores for the concern throughout the New England States and through the South as far as Florida. Murray now has about 1,000 stores in operation. The company is busy on tires and reports that the mechanical goods production is far ahead of last year.

The Joseph Stokes Rubber Co., Trenton, N. J., is operating five and a half days a week and five nights to fill orders. The company is installing new machinery in the additions recently completed.

The Pierce-Roberts Rubber Co., Trenton, N. J., is operating normally in all lines of production. The company is looking forward to a busy winter.

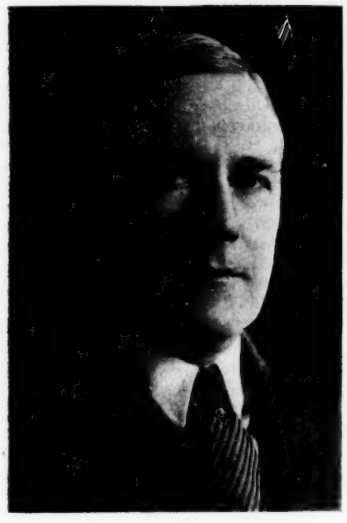
The Puritan Rubber Co., Trenton, N. J., announces that business is good and that prospects for the coming months are very promising.

The Thermoid Company, Trenton, N. J., announces that its new $150,000 unit, adding additional space for the manufacture of asbestos brake linings, clutch rings, and packings, has been placed in operation at its plant. The building contains 17,800 square feet of floor space and has been built to house three complete production units. At present machinery sufficient for one production unit has been installed, but it will make sufficient additional Thermoid products to increase the company's annual sales approximately 10 per cent, according to executives.

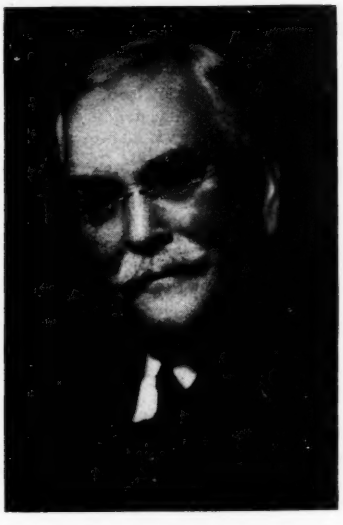
Annual Exposition

The National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York, N. Y., from December 2 to 7. Charles F. Roth, Grand Central Palace, is manager.

THE TRENTON INDUSTRIAL PROGRESS EXPOSITION



C. H. OAKLEY
Chairman, Exposition Executive Committee



JOHN A. CAMPBELL
Chairman, General Exposition Committee

THE Trenton Industrial Progress Exposition was held in the Armory at Trenton, N. J., during the week of October 28 to November 2, 1929. The exposition had its original conception as a part of the early planning for the events of the 250th Anniversary Celebration Week, of which it was an important feature. The committee in charge of the celebration assigned to the Trenton Chamber of Commerce the task of putting on an exposition designed to pay tribute to Trenton's growth in industrial activity. John A. Campbell, president of the Trenton Potteries Co., accepted the chairmanship of the General Exposition Committee. C. H. Oakley, president of the Essex Rubber Co., became chairman of the Exposition Executive Committee. This leadership was actively supported by committees consisting of forty industrial executives. Exhibits were displayed by one hundred and fifteen industries. Among these were fourteen exhibits of Trenton's rubber manufacturers and allied industries.

The Essex Rubber Co. had a booth of oriental design and decoration, roofed with alternate crude rubber strips of pale crepe and smoked sheet. The style show of latest designs in rubber sole and heel goods featured this exhibit. The Luzerne Rubber Co. and the Joseph Stokes Rubber Co. showed lines of hard rubber products of great variety. Mechanical rubber goods of all sorts made up the displays of the Acme Rubber Manufacturing Co., Hamilton Rubber Manufacturing Co., Home Rubber Co., and The Thermoid Company. Rubber flooring was the basis of an artistic booth by the Puritan Rubber Manufacturing Co. The many types of steel-enforced rubber hose formed an interesting exhibit by the Woven Steel Hose & Rubber Co. Rubber mill machinery of all kinds was shown by Wm. R. Thropp & Sons Co. and John E. Thropp's Sons, Inc. The use of rubber in wire and cable insulation was portrayed in exhibits by the Crescent Insulated Wire & Cable Co. and J. A. Roebling Sons Co. Dies, engravings, and rubber goods labels were exhibited by the Hulslander Manufacturing Co. The Atlantic Products Corp. had an inviting display of rubber cloth golf bags and other products, amid surroundings of surprising naturalness.

An attendance of seventy-five thousand for the six afternoons and evenings of the exhibition gives a fair index of the enthusiasm with which the Trenton Industrial Progress Exposition was received not only by Trenton's own citizens, but also by visiting delegations from New York, Philadelphia, Newark, and other nearby cities. Groups of leading officials of the Pennsylvania Railroad and the Reading Co., as well as about thirty-five officials of the embassies of the leading world powers in Washington were among the visitors.

Sulfogene Yellow GGCF

Sulfogene yellow GGCF is a sulphur yellow of a clear greenish shade, and containing the minimum amount of copper. It is thus particularly prepared for goods which are to be rubberized. The color stands vulcanization, becoming somewhat greener.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
2472	Philippine Market for Canvas Shoes.
2473	Canadian Tire Exports, August, 1929.
2476	Canadian Tire Exports, July, 1929.
2478	German Exports of Belting and Hose, First Half of 1929.
2480	Tire Report for Estonia.
2481	Annual Tire Report for Netherland East Indies.
2487	British Exports of Footwear, August, 1929.
2488	French Footwear Exports, August, 1929.
2489	French Tire Exports, August, 1929.
2494	Italian Tire Exports, First Half of 1929.
2495	Comparative Exports of Solid Tires from the United States, Canada, the United Kingdom, Germany, Italy, and France, First Half of 1929.
2496	Annual Tire Report for Straits Settlements.
2498	Rubber Production in Netherland East Indies.
2501	Final Official Report of Netherland East Indies Rubber Cultivation, 1928.
2502	Final Report of Dealers' Stocks of Automobile Tires in the United States, October 1, 1929.
2508	Crude Rubber Reexports from the United States, September, 1929.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country	Purchase or Agency
41,465	Erasers	Auckland, New Zealand	Both
41,516	Hard rubber	Hennef, Germany	Purchase
41,550	Druggists' sundries	Athens, Greece	Agency
41,633	Balloons	Manila, P. I.	Agency
41,655	Infants' goods	Buenos Aires, Argentina	Agency
41,663	Automobile goods	Zurich, Switzerland	Either
41,691	Footwear	Melbourne, Australia	Agency
41,694	Shoes	Vienna, Austria	Both
41,706	Tires and tubes	Lisbon, Portugal	Agency
41,720	Tires	Turin, Italy	Both
41,727	Belting	Winnipeg, Canada	Agency
41,732	Thread	Milan, Italy	Agency
41,736	Insulating tape	Wellington, New Zealand	Agency
41,771	Composition flooring	Wellington, New Zealand	Both
41,778	Tires	Hong Kong, China	Agency
41,780	Belting	Bombay, India	Agency
41,809	Sport goods	Christchurch, New Zealand	Agency
41,824	Tires	Vienna, Austria	Agency
41,850	Slippers, canvas shoes, caps, gloves, kitchen equipment, and sport goods	Prague, Czechoslovakia	Agency
41,852	Sport goods	Buenos Aires, Argentina	Agency
41,856	Automobile mats	Montreal, Canada	Both
41,857	Sport goods	Altona, Germany	Both
41,875	Tires	Surabaya, Java	Both
41,880	Baby pants	Berlin, Germany	Agency
41,892	Tires and tubes	Addis Ababa, Ethiopia	Agency
41,898	Tires	Lagos, Nigeria, Africa	Agency
41,899	Canvas shoes	Beirut, Syria	Both
41,916	Milking machinery equipment	Hamburg, Germany	Purchase
41,917	Tubes	Nice, France	Purchase
41,918	Shoes and inner tubes	Chefoo, China	Purchase

EASTERN AND SOUTHERN

The American Cyanamid Co., 535 Fifth Ave., New York, N. Y., is arranging preliminary plans for general expansion and improvement in a number of its plants, including works of recently acquired companies in New Jersey and Pennsylvania. Work will include the construction of new buildings and installation of equipment. The company is carrying out a financing program, including the sale of new stock totaling $23,841,000, portion of the fund to be used for the development noted.

The Salesmen's Association of the American Chemical Industry installed its newly elected officers at a dinner at the Western Universities Club, New York, N. Y., on November 7. Among the officers for the ensuing year are Victor E. Williams, of the Monsanto Chemical Works, president, and B. J. Gogarty, of American Solvents & Chemical Co., secretary-treasurer.

Excello-Grimes Corp., 132 Nassau St., New York, N. Y., manufactures leather mats and the X-L-O folding rubber mat.

Alvin F. Buchanan has been appointed manager of mechanical goods advertising for the United States Rubber Co., 1790 Broadway, New York, N. Y.

Evan J. Edwards, sales manager of The North British Rubber Co., Ltd., London, England, was on a business trip to the United States and returned to England late in November.

E. R. Bridgwater on November 1 succeeded H. H. Replogle as sales manager of the Rubber Chemicals Section of E. I. du Pont de Nemours & Co., Wilmington, Del. Mr. Bridgwater is well known among American rubber technologists as a chemical engineer of exceptional ability. He is a graduate of Akron University and the Massachusetts Institute of Technology. His past connections with the rubber industry included service in the chemical laboratories of The B. F. Goodrich Co., and Firestone Tire & Rubber Co. at Akron, O., and as chief chemist since 1924 for E. I. du Pont de Nemours & Co.

The Vulcanized Rubber Co., Morrisville, Pa., is very busy in all its departments. S. H. Renton, president, says that conditions in the hard rubber line look good for the future.

The Pennsylvania Rubber Co., Jeannette, Pa., is now showing its 1930 line of tires to dealers at the factory, contingents from all parts of the country having been company guests recently. A series of conferences were held with the dealer groups with W. O. Rutherford, president, in charge.

W. D. Anderson, president, Bibb Manufacturing Co., Macon, Ga., as principal speaker at the annual banquet of the Macon Overseers' Organization sounded its keynote when he declared that unless those responsible for the operation of cotton mills have the right idea as to their responsibility and duty to mill employes, there can be no successful operation of the plants.

The Rubber Products Corp., Doylestown, Pa., reports that business is good in the manufacture of molded goods and automobile inner tubes. The company is busy turning out washers and joints for milking machines.

The Dixie Elastic Goods Mfg. Co., Middlesboro, Ky., has taken out articles of incorporation and has increased its capital stock to $20,000, according to Joseph L. Stengel, president and general manager of the company.

"We have added additional equipment to meet the demand for our products and to give our customers prompt service," adds Mr. Stengel.

C. Olin North, well-known chemist and rubber technologist, has resigned from The Rubber Service Laboratories Co. and the Elko Chemical Co., Akron, O., and Nitro, W. Va. Mr. North was one of the original incorporators of Rubber Service and served as secretary, treasurer, and development manager for nearly eight years. When Rubber Service was absorbed recently by the Monsanto Chemical Works, St. Louis, Mo., he became vice president in charge of rubber service development. He has organized the Kavalco Products Co. to manufacture aromatic chemicals.

Rubber Trade Association Of New York, Inc.

The annual meeting of Rubber Trade Association of New York, Inc., 14 S. William St., New York, N. Y., was held on November 14, 1929, and the following were reelected to the Board of Directors to serve three years: H. Page, D. A. Paterson, and E. Stevenson. J. S. Rodenbough was elected to serve on the board for one year.

After the annual meeting, the Board of Directors reelected the following officers to serve until November, 1930, or until their successors are chosen and assume office: President, F. Pusinelli; Vice President, D. D. Haldane; Treasurer, D. A. Paterson; Secretary-Manager, B. G. Davy.

The resignation of R. L. Chipman was accepted and L. D. Stiles was elected to serve until the next annual meeting.

A. S. M. E. Annual Meeting

The annual meeting of the American Society of Mechanical Engineers will take place December 2-6 at 29 West 39th St., New York, N. Y. Calvin W. Rice, of the same address, is secretary.

NEW INCORPORATIONS

BEYER RUBBER CORP., Nov. 6 (New York), capital stock 10,000 shares preferred par value $100 and 4,000 shares common without par value. V. W. Quinn, H. G. Carroll, and C. F. Bailey, all of 165 Broadway, New York, N. Y. Principal office, Manhattan. Rubber goods.

BIRMINGHAM RUBBER PRODUCTS CO., Nov. 7 (Delaware), capital stock 3,000 shares common without par value. H. E. Grantland, H. H. Snow, and L. H. Herman, all of Wilmington, Del. Manufacture and deal in rubber goods.

KEITH BON & CO., INC., Oct. 9 (New York), $100,000. K. Bon, R. H. Toeplitz, C. F. Seabrook, all of New York, N. Y., and W. H. Bacon, Bridgeton, N. J. Principal office, 44 Beaver St., New York, N. Y. Deal in crude rubber.

LAMBERTVILLE RUBBER CO., INC., Nov. 7 (New Jersey), capital stock 4,000 shares of preferred and 5,000 shares of common par value of each $100. P. Fireman, Trenton, J. T. and W. E. Crowley, Lambertville, all in N. J. Principal office, 287 South Main St., Lambertville, N. J. Manufacture and deal in rubber shoes, boots, etc.

MONROE RUBBER PRODUCTS CO., Nov. 6 (New Jersey), capital stock $100,000, 10,000 shares par value $10. R. and J. C. George of Monroe, N. Y., and W. C. Casperson, 170 Market St., Paterson, N. J. Principal office, 146 Washington St., Paterson, N. J. Manufacture and deal in rubber and rubber goods.

RAYBESTOS CO., Nov. 1 (Delaware), capital stock 100 shares without par value. E. D. Alyea, Montclair, N. J., R. W. Vaughan, Brooklyn, N. Y., and J. W. Brabner-Smith, New York, N. Y. Manufacture and deal in asbestos, rubber, and general loom products.

RUBBER OLEUM CORP., Nov. 4 (New York), capital stock 2,000 shares, 1,000 shares preferred par value $100 and 1,000 shares without par value. J. A. Holcombe, 313 S. Long Beach Ave., Freeport, L. I., V. Carmichael, Merrick, N. Y., and H. M. Newman, 245 Echo Place, Bronx, N. Y. Principal office, Manhattan. Rubber and rubber floor coverings, etc.

Treasury Decisions

BALLS. No. 9993.—Protests 353553-G, etc., of Geo. Borgfeldt & Co. (New York). Rubber balls classified as toys at 70 per cent ad valorem under paragraph 1414, tariff act of 1922, are claimed dutiable at 30 per cent under paragraph 1402.

Opinion by J. Sullivan. In accordance with stipulation of counsel and on the authority of United States *v.* Woolworth (16 Ct. Cust. Appls. 421, T. D. 43136) the rubber balls in question were held dutiable at 30 per cent under paragraph 1402. *Treasury Decisions,* Vol. 56, No. 17, p. 32.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Baldwin Rubber Co.	A Pfd.	$0.37½ q.	Dec. 31	Dec. 20
Boston Woven Hose & Rubber Co.	Pfd.	$3.00 s. a.	Dec. 16	Dec. 2
Boston Woven Hose & Rubber Co.	Com.	$1.50 q.	Dec. 16	Dec. 2
Firestone Tire & Rubber Co.	400%	.....	Oct. 28	.....
Firestone Tire & Rubber Co.	7% Pfd.	$1.75 q.	Nov. 15	.....
Firestone Tire & Rubber Co.	A Pfd.	$1.50 in., q.	Dec. 1	Nov. 15
B. F. Goodrich Co.	Com.	$1.00 q.	Dec. 2	Nov. 18
B. F. Goodrich Co.	Pfd.	$1.75 q.	Jan. 2	Dec. 10
Goodyear Tire & Rubber Co.	1st Pfd.	$1.75 q.	Jan. 1	Nov. 30
I. B. Kleinert Rubber Co.	Com.	$0 62½ q.	Dec. 16	Dec. 2
Raybestos-Manhattan, Inc.	Com.	$0 65 in., q.	Dec. 16	Dec. 2

MIDWEST

United States Rubber Co., Detroit, Mich. Unit sales of tires to dealers by United States Rubber Co. in the first nine months this year were 12 per cent above like period last year, according to L. D. Tompkins, general manager of the tire department. September sales to dealers were 15.4 per cent over August and 26.2 per cent ahead of September, 1928.

Cutler-Hammer, Inc., Milwaukee, Wis., has announced the removal of its St. Louis, Mo., district sales office from 611 Olive St. to 1914 Washington Ave. The company also has established a warehouse at the same address, where a stock of standard C-H motor control and wiring devices will be carried for immediate delivery. The warehouse proper covers almost 4,000 square feet of floor space. These new facilities will enable Cutler-Hammer better to serve its trade in the South and Midwest.

The Zook Tire Co.'s new home at Pueblo, Colo., distributer for Thorobred tires and tubes, of The Dayton Rubber Mfg. Co., Dayton, O., is one of the most up-to-date and complete super-service stations in this territory. Zook's success is another example of what can be achieved by handling good products and rendering quality service. Though his prices are reasonable, his organization prospers by "broadcasting" to consumers the fact that it is not what is paid for a thing but what you get for your money that counts.

Sears, Roebuck & Co., Chicago, Ill. The 10,000,000th all-State tire was manufactured for Sears-Roebuck on October 31. Production of these tires began June 1, 1926, and the 10,000,000 mark was therefore reached in only three years and five months. During the peak production period last May and June output reached an average of 28,000 tires daily.

Charles E. Reed & Co., 3227 Carroll Ave., Chicago, Ill., manufactures shoe pattern machinery, including the Reed power machine used for cutting and grading rubber boot and shoe patterns.

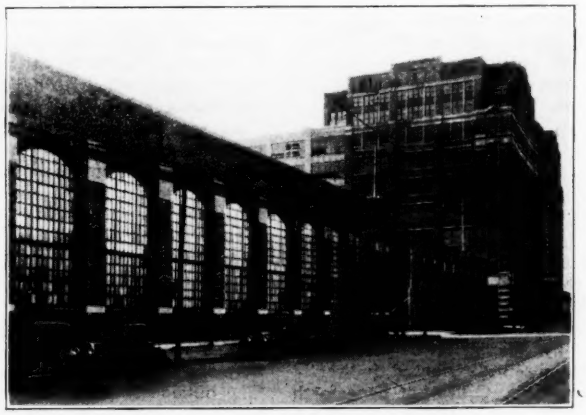
Montauk-Coronado Rubber Co., manufacturer of sponge rubber products, 3012-14 Clybourn Ave., Chicago, Ill., has announced the appointment of Arnim R. Brandt as its general manager. Prior to coming to Chicago, Mr. Brandt was connected with the sales department of the Akron Rubber Reclaiming Co., Barberton, O.

Andre Wightman, formerly superintendent of the Vail Rubber Works, St. Joseph, Mich., has resigned and is now with the Rapid Roller Co., Chicago, Ill., in a similar capacity. The latter concern manufactures printers' rollers.

Century Carbon Co., 365 E. Illinois St., Chicago, Ill., which is controlled by Wishnick-Tumpeer, Inc., 251 Front St., New York, N. Y., announces that H. W. Perritt, formerly director of the Louisiana Minerals Division of the State Department of Conservation, Monroe, La., has assumed the duties of general manager of the gas and land division of that company.

Mr. Perritt will contribute to the operation of plant units now utilizing ten million cubic feet of gas daily, as well as the new gasoline absorption and carbon black plants which, when operations commence on January first, will have a daily consumptive capacity of twenty million cubic feet of gas.

Detroit Plant and Offices of U. S. Tire Department



The new office floors of the sales and manufacturing departments attract much attention and commendation from visitors. The reception halls with impressive furnishings, the women elevator operators in trim uniforms, the bright offices overlooking the Detroit River—all reflect the presence of a strong and active organization.

Detroit Business Leaders Entertain U. S. Directors

The concentration of the United States Rubber Co.'s tire activities in Detroit, Mich., was recognized by the leading business men of that city, who entertained the company's Board of Directors at a dinner at the Detroit Club on the evening of October 30, 1929. The speaker of the evening was Ernest Hopkinson, vice president and director of development.

Directors present were: F. B. Davis, Jr., Carle C. Conway, Ernest Hopkinson, Edward J. Coughlin, William O. Cutter, Herbert E. Smith, L. D. Tompkins, and Henry Davis.

Milking Machine Diaphragm

All milking machines are fitted with high-grade rubber tubing and teat cups. One of the popular mechanical milkers is equipped with a 9-inch rubber diaphragm of special design and construction, which is clamped over the top of the milk receptacle, serving the double purpose of cover and suction diaphragm. The latter effect is secured by a reciprocating motion imparted to the diaphragm at its center, where a connecting rod is attached to it by threaded connection with a metal nut embedded in the rubber. This part of the diaphragm is reenforced by a disk of wire mesh molded integral with the nut mentioned.

The diaphragm in service is actuated by an electric motor and has a motion similar to that of the diaphragm used in the ordinary contractor's trench pump. It is thus very effective and durable in service. Hinman Milking Machine Co., Inc., Oneida, N. Y.

Absorbent Slabs for Broadcasting Equipment

Experience has proven that round disks of sponge rubber set under the corners of broadcasting apparatus serve better as proof against shocks than a solid rubber wall under the entire equipment. With heavier equipment, however, stock somewhat harder than sponge, about 50 per cent hard, not really a tread stock, nor sponge, is more satisfactory.

Rubalt

Rubalt is a new waterproof, rustproof, and acid resistant paint of rubber, bitumen, and benzol. It is a retardant of various types of corrosion. The sulphur is removed from the bitumen which is then combined with the rubber by a special process. Certain other ingredients are added to make the paint dry rapidly and produce a lustrous enamel finish.

SEPTEMBER EXPORTS OF TIRE FABRICS from the United States totaled 510,227 square yards of cord fabric, valued $206,802 and 264,434 square yards of other tire fabrics, valued $119,717. Hose and belting duck exports were 57,256 square yards, valued $34,138.

PACIFIC COAST

United States Rubber Co. organization plans in the Pacific Coast are progressing rapidly and will be functioning completely by January 1, according to J. B. Brady, general manager Pacific Coast division, San Francisco. A decided promotion is announced for Page Noll, energetic assistant of tire sales to Manager C. W. Ort at Los Angeles. Mr. Noll reported in Detroit on November 15 to L. M. Simpson, general manager of tire sales, to take charge of the Central States, one of the five regional divisions of the company. H. J. Bock has taken over Mr. Noll's work in Los Angeles. H. A. Farr, of San Francisco, long Pacific Division sales manager of tires, is now assistant to Mr. Simpson at Detroit. His place on the Coast has been taken by J. B. Magee, formerly Los Angeles district sales manager. J. B. Bender has been made manager of footwear at Portland, Ore., a post formerly held by Mr. Ort.

Firestone Tire & Rubber Co. of Calif. is making rapid headway in the construction of two huge wings to the original factory in Los Angeles, which will double its output in 1930. According to Vice President and General Manager R. J. Cope, the buildings will be quite completed by December 15, and all the heavy mechanical equipment will be installed and production begun not later than February 15. Tire and tube output continues to be much behind the demand, even though the factory is being run to capacity night and day. Russell A. Firestone, vice president of the California company, and Vice President J. W. Thomas of the parent Firestone company, arrived from Akron on November 18 for a stay of several weeks in the Southwest. Appointment of C. W. Peckham, famous war ace of the Royal Flying Corps, as assistant to Manager H. D. Tompkins of the aeronautical department, has been announced by R. C. Tucker, general sales manager. He will have charge of Firestone aviation activities in the eleven far west states.

Scougal Tire & Rubber Co., 2731 First Ave., S., Seattle, Wash., recently completed a molded rubber gasket 200 feet long for a U. S. Navy job. The concern, owned by M. R. Scougal, who is assisted by his son, Rolland, recently moved into its new building. It recovers feed, wringer, and printing rolls, rubber tires, truck wheels, widens and repairs belts, etc. Business is reported better than a year ago.

Universal Rubber Mfg. Co., 938-958 Harrison St., San Francisco, Calif., on account of steadily expanding business in general mechanical rubber lines, has bought adioining improved property on Harrison St. between Fifth and Sixth Sts., 300 by 85 feet. Large orders for hose have necessitated putting the hose department on double shift. A marked increase in output of molded goods and specialties is reported, as compared with last year. Numerous orders are reported for the sponge rubber printing press roll patented by the company (U. S. Patent No. 1,555,389). The company states that in 1930 it will add considerable equipment so that it can speed up production. Geo. M. Stevens is president and C. M. Shannon factory manager.

Richter Rubber Co., 305 First Ave., S., Seattle, Wash., of which Franz Richter is sole owner, states that 1929 business has been exceptionally good. The concern is one of the largest distributers in the Northwest, doing a wholesale trade only in rubber hose, tubing, matting, sponge rubber, plumbers' and electricians' rubber goods, and specialties.

Koori Trading Co., Inc., has been incorporated to import and export rubber. The capital is $25,000. M. Orito is president, Helen Dillon secretary, and Masao Igasaki attorney, and they are the directors. The business office is Room 324 Lissner Building, 524 S. Spring St., Los Angeles, Calif.

Eno Rubber Corp. 110-114 E. 17th St., Los Angeles, Calif., according to President Roy R. Musser, has thus far in 1929 much exceeded its 1928 volume of business, and its large factory in Torrance, a Los Angeles suburb, has for many months been working overtime in all departments in order to overtake orders. One of its specialties for which it has been getting large orders from various parts of the country is "oSo-Soft" air cushions, the invention of Vice President Charles N. Merralls. Besides making a wide range of mechanicals, it also recovers printers' and wringer rolls and truck wheels.

Huntington Rubber Mills, 1580 Macadam, corner Nevada St., Portland, Ore., according to President and General Manager Harry Huntington, continues to enjoy a good demand for its rubber soling and heels, repair stocks, general mechanicals, shock absorbers for automobiles, etc., and prospects are excellent. The female anatomical model for clinics and medical schools made by the company is finding extensive sale, and work on the male model is nearly complete.

Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y., has of late been doing much to strengthen its position in the far west field, according to Western Manager Walter M. Curry, who is also in charge of the Salt Lake City, Utah, branch at 625 Dooley Block. A marked increase for 1929 is noted in sales of hose, belting, and general mechanicals throughout the Pacific territory. Since the company merger two years ago, goods have been distributed indirectly in San Francisco, Calif., but henceforth a branch will be maintained at 7 Front St., it having been established three weeks ago by Charles K. Everett, formerly of Los Angeles. The other coast branches are at 505 E. Third St., Los Angeles, in charge of Harry M. Davis, and at 538 First Ave., S. Seattle, Wash., in charge of W. D. Mackay

Dayton Rubber Mfg. Co., Dayton O., through President John A. MacMillan, announces one of the largest distributer contracts on record. It was effected on the occasion of his recent visit to Los Angeles with Nelson & Price, Inc., of that city, which concern has nineteen branches in the Southwest and is said to be the largest independent tire-dealing firm in the country. The deal involves exclusive distribution of Dayton tires in the Southwest, extends over a long term of years, and is said to aggregate nearly $50,000,000. The concern has for several years been exclusive distributers of India tires. Joseph O. Schiller, formerly Pacific Coast manager for the Dayton company, joins Nelson & Price, Inc., as vice president and general sales manager.

Seattle Rubber Band Co. 1913 Eighth Ave., W. Seattle, Wash., owned and operated for the past two years by C. W. Gowey, is reported by Mr. Gowey as doing a large and steadily increasing business with wholesale houses on the Coast. The concern makes a large variety of rubber wrapping bands, which are replacing twine to a considerable extent.

Goodyear Tire & Rubber Co. of Calif. on November 26 manfactured its 15,000,000th tire at the factory in Los Angeles, Calif., which in a way commemorated the tenth anniversary of the company's organization in November, 1919. During the first year it averaged less than 1,000 tires a day, but this year daily production rose to 17,000 tires. It imports 17,000 tons of crude rubber yearly, largely from Goodyear plantations in Sumatra, and its textile mills adioining the tire plant now need over 20,000 bales of cotton for fabric. It employs on an average 3,200 people, pays out over $5,000,000 in wages, and spends another $5,000,000 for various supplies, material, and equipment. Cliff Slusser, first superintendent and now vice president and factory manager, of the Goodyear T. & R. Co., Akron, O., was a recent visitor in the Southwest and addressed the Los Angeles Advertising Club at a luncheon at the Biltmore Hotel and at which Goodyear Advertising Manager Jos. X. Kennelly presided. Burgess Darrow, first development manager and now filling a similar post with the parent company in Akron, was also a recent visitor while en route to the Goodyear factory in Australia. Mr. Slusser was tendered a dinner by the Los Angeles official personnel.

Samson Tire & Rubber Corp., Los Angeles, Calif., having got its big new factory on Telegraph Road in full operation, is now hurrying the completion of the six-story administration building. The outside is practically complete, but much detail work has yet to be done on the inside. Tube production is being transferred from the original factory at Compton, and the latter works may before long be utilized wholly for the production of mechanical rubber goods. In fact, the company is now making a large quanity of fan belts at that fac-

tory, which is considered as exceptionally well adapted for mechanical goods. Tire production, somewhat interfered with during building operations, is mounting rapidly. The company distributes through some 2,000 dealers throughout the United States and has large contracts with Sears, Roebuck & Co. and Montgomery Ward & Co.

Kelly-Springfield Co. continues to add to its chain of department store tire distributers throughout the far west field, some fifty stores having already signed contracts for generally long periods to handle tires on instalment, service, credit, and standard price basis. The conditions are said to be very satisfactory to the tire makers and the stores.

G. McNeil, formerly Firestone branch manager in Seattle, Wash., has been made San Francisco branch manager, being succeeded in Seattle by P. W. Pym, nine years a Firestone salesman. D. I. Raymond of the Portland, Ore., branch has been made Mr. McNeil's assistant, and A. J. Raymond has taken his place in Portland.

Patterson-Ballagh Corp., 65th St. and Wilmington Blvd., Los Angeles, Calif., which brought suit against the Eno Rubber Corp. and the Rotary Specialties Co. claiming infringement of the Bettis patent, No. 1,573,031, on a drill pipe and casing protector, also known as a 'rubber doughnut," has been awarded a decision by Judge Henning in the United States District Court, which adjudicates claims 2 and 5 of the patent. An order has been issued forbidding further manufacture, sale, and distribution by defendants of the products named and requiring payment of judgment and damages.

Lee Rubber & Tire Co., Conshohocken, Pa., has opened a coast branch in San Francisco, Calif., at 1350 Van Ness Ave., in charge of Joseph J. Pie, who has had seventeen years' experience in marketing tires, a large part of the time being spent with the Lee concern. E. L. Van Duren is Pacific Coast Division manager. While his office is at the plant in Pennsylvania, he makes trips quarterly to the coast field. Lee business in that section, according to company representatives, is not only holding up very well but also showing a good average gain.

Crude rubber continues to hold its lead at the port of Los Angeles among imports from fifteen foreign countries. For the year ending June 30 last the total value was $12,021,534, or almost 23 per cent of the total imports. Of this amount $9,445,735 came from the Straits Settlements.

H. Muehlstein & Co., Inc., crude and scrap rubber dealers, to accommodate increasing coast business, has doubled its office capacity at its branch 728 S. Hill St., Los Angeles, Calif.

Frederic W. Taylor, vice president, American Rubber Producers, Inc., Salinas, Calif., has been spending several weeks at the guayule development station of the Continental Rubber Co. near Tucson, Ariz.

The Fisk Tire Co., Inc., Chicopee Falls, Mass., was well represented at a regional sales conference held recently in Salt Lake City, Utah, at which plans were outlined for the 1930 sales campaign. Among those present were: Vice President Frank K. Espenhain, Chas. M. Piper, E. E. Dearth, C. H. Johnson, N. B. Brodhead, J. I. O'Brien, R. G. Bath, and Frank L. McCabe of the company's staff.

Toy Craftsmen Co., Lindsay, Calif., has installed machinery for increasing the output from 1,000 a week to 2,000 a day of a patented repeating rifle designed by Ben Fisher for the use of rubber bands cut from inner tubes. E. J. Foote is manufacturing manager.

Pocono Rubber Cloth Co., Trenton, N. J., is planning for a more extensive distribution of its products in the Pacific Coast field, in which Vice President-Treasurer H. B. Slusser recently spent a month studying industrial conditions.

Coast Rubber Men In Golf Tournament

An affair rated as the best in which they had participated was the annual tournament and banquet of the Pacific Coast Mechanical Rubbermen's Golf Association at the Rancho Golf Club, Los Angeles, Calif., on November 19, in which about forty leaders in the rubber trade from San Diego to Seattle took part. The prize donors and winners were:

Qualifying Round, Low Net: Seattle Brass Co. Trophy, Winner J. B. Lippincott (for the third time); W. C. Hendrie & Co. Trophy, Runner-up F. L. Hockensmith.

Qualifying Round, Low Gross: Pioneer Rubber Mills Trophy, Winner L. W. Winship; L. A. Rubber & Asbestos Works' Trophy, Runner-up J. D. Horan.

Championship Flight: Placque and Boston Woven Hose & Rubber Co. Trophy, Winner J. D. Horan (for the second time); J. B. Lippincott Co. Trophy, Runner-up L. W. Winship.

First Flight: Pacific Coast Rubber Co. Trophy, Winner Tom West; Plant Rubber & Asbestos Works Trophy, Runner-up William Brown.

The defeated fours were as follows:

Championship Flight: L. P. Degen Belting Co. Trophy, Winner J. L. Hockensmith; Electric Hose & Rubber Co. Trophy, Runner-up J. B. Lippincott.

First Flight: The B. F. Goodrich Rubber Co. Trophy, Winner James E. Nevin; Paris Inn Trophy, Runner-up H. B. Chandlee.

Putting Contest: Winner Milton Sprague, 1 dozen U. S. Royal Golf Balls, by U. S. Rubber Co.; second prize, L. W. Winship, 1 dozen U. S. Royal Golf Balls, by U. S. Rubber Co.

Irvin Reed, Pacific Coast Rubber Co., San Francisco, Calif., was elected president; Nat. Dodge, American Rubber Mfg. Co., Oakland, and Art. Corder, Los Angeles Rubber & Asbestos Works, Los Angeles, vice presidents, and Henry Martine, Standard Rubber Co., San Francisco, secretary-treasurer.

Pacific Goodrich Rubber Co., Los Angeles, Calif., will accept general contract bids after January 1, 1930, for the construction of an addition to the plant at 5400 E. Ninth St. The new building will be of steel frame, one-story, and about 51 by 250 feet. It will cost about $150,000 and be used as a warehouse and to accommodate some of the departments now at the Los Angeles branch, 1392 E. Seventh St. The company also plans to build a $15,000 service station in Whittier, and one each in San Francisco, Chico, and Ventura, Calif. The company was recently host to its salesmen in the eleven far west states at the Hotel Huntington, Pasadena, which meeting was attended by General Sales Manager Frank E. Titus, and the following from the parent Goodrich plant in Akron, O.: Vice President T. G. Graham; Tire Sales Manager Robert McTammany; C. B. O'Connor, general manager of Silvertown, Inc.; P. J. Kelly, advertising manager; Col. J. A. Kick, manager of sales promotion; Wilson Bray, manager of the heavy duty and bus tire division; and Harry M. Baker, head of the sales personnel department. Jay Smith, who had been manager of tire sales at the Los Angeles plant, has been made San Francisco branch manager, and has been succeeded by H. S. Wheeler, former manager of truck and bus sales, who will be assisted by R. E. Jeffers, who will also develop a new sales promotion department. H. E. Keller, of Akron, sales manager for the combined Diamond and Brunswick tire output of the Goodrich company, was in charge of a recent conference at the Los Angeles factory of Diamond and Brunswick salesmen in the Coast division. Frank H. Schweitzer, manager of far west aviation sales, has been confined to a hospital for several weeks with intestinal influenza.

Continental Mfg. Co., capital $25,000, has been incorporated in California to make rubber goods. The office is in the Bryson Building, S. Spring and W. Second Sts., Los Angeles, and the officers are Roy S. Gangestad, attorney, 510 W. Sixth St., Henry R. Sprague, and E. Tharalson, all of Los Angeles. The first product, for which a patent has been applied, is a sponge rubber bath brush.

W. Richard Hucks, chief compounder of the Pacific Goodrich Rubber Co., Los Angeles, Calif., left on November 1 for a three weeks' trip to Akron, O., where he conferred with technical executives of the parent Goodrich company.

Adjudicated Patents

TIRE. (D. C. N. Y.) Overman patent, No. 1,092,078, for vehicle tire, claims 6 and 10 held valid and infringed. Overman Cushion Tire Rubber Co. *v.* Goodyear Tire & Rubber Co., 34 F. (2d) 508.

(D. C. N. Y.) Overman reissue patent, No. 13,626, for vehicle tire, claims 1, 4, and 5 held invalid. Overman Cushion Tire Rubber Co. *v.* Goodyear Tire & Rubber Co., 34 F. (2d) 508. *Official Gazette*, Vol. 388, No. 2, p. 277.

CANADA

Automobile tire manufacturers last month issued booking prices, following an adjustment made in United States prices in October. Canadian firms have adopted a similar method of quoting to the trade. The new list is approximately 10 per cent higher than formerly, but the dealer is allowed a discount which will make practically no change in the actual cost of tires to the trade. The list will allow dealers an opportunity, it is stated by manufacturers, to make a better profit on their sales than they have enjoyed for some time.

Rubber goods manufacturers and jobbers report that since the 1930 prices on garden hose were issued, total booking orders have been very satisfactory. Retail stores had small carryover stocks left, and dealers are buying more actively now for the coming year. The mechanical rubber goods market is following a steady course, with little variation noted. Prices have remained without change for some months.

The gross value of production for the entire Canadian rubber industry amounted to $97,208,713 in 1928, an increase of $5,794,983 or 6.34 per cent over 1927. Of the three main classes of products rubber tires and tubes accounted for $49,708,538 of the total or 51.1 per cent, rubber footwear for $32,412,611 or 33.4 per cent, and other rubber goods for $15,087,564 or 15.5 per cent.

Imports of raw and partly manufactured materials aggregated in value $20,041,053, while the wholly manufactured totaled $3,570,490. Of the total value of imports, goods to the value of $21,643,690 entered Canada from the United States, $653,813 from the United Kingdom, and $1,314,040 from other countries.

Value of goods exported during the calendar year 1928 amounted to $30,693,462, an increase over 1927 of $2,692,530 or nearly 9.6 per cent.

The amount of capital invested in the rubber industry in 1928 was $70,459,066 to which the rubber tire section contributed $54,222,878 and the footwear section $16,236,188.

The number of persons employed in the industry in 1928 was 17,095, of whom 2,145 were salaried employes and 14,950 were wage earners. Of those employed 12,418 were males and 4,677 females.

The total amount of salaries and wages paid in 1928 was $18,943,730, of which $3,602,753 was for salaries and $15,340,977 for wages.

Canada now has 1,061,830 licensed motor cars, or one to about every ten persons. The Dominion stands fourth among nations of the world in automobile ownership.

U. S. L. Battery, Ltd., is operating its recently completed factory at Dufferin St. and Geary Ave., Toronto, Ont., for the manufacture of storage batteries.

Dominion Rubber Co., Ltd., Montreal, P. Q., is altering and extending its St. Jerome, P. Q., factory at a cost of approximately $150,000.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., has announced the appointment of W. H. Tyler as manager of dealer tire sales division with headquarters at the main office. Mr. Tyler has had a varied and successful career in the rubber industry, having held positions with Goodyear and other rubber companies in the States, in the capacity of manager of solid tire sales and manufacturers' equipment business. In 1925 Mr. Tyler became affiliated with the Seiberling Rubber Co., Akron, O., and when transferred to Canada, was holding the position of district manager, with headquarters at Syracuse. Through his many years' experience in the tire field he is fully familiar with present-day conditions and is in a position to solve many of the problems facing the independent tire dealers in Canada.

W. H. Tyler

"On with Seiberling" is the 1930 slogan adopted by the Canadian Seiberling company in advertising to dealers. A book has been prepared for distribution to dealers outlining the company's advertising plans for the coming year, including a co-operative direct-by-mail campaign and suggested dealer copy for local papers. The Seiberling company shares the cost of advertising submitted to and approved by the company's advertising department prior to its publication; such support not to exceed 2½ per cent of the dealer's billing with the company.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. The combined operating profits, after providing for all manufacturing, selling, and administrative expenses and taxes aggregated $4,322,259. From profits there was set aside $834,116 for depreciation of buildings and plant, leaving net profits of $3,488,142, as compared with combined net profits of $2,790,460 for the previous fiscal year, which up to that time had been the most profitable in the history of the Canadian Goodyear companies.

The net consolidated earnings of the companies show that the dividends on the preferred stock were earned 6.4 times and the net amount earned per share on the common stock was $21.94, as compared with $16.57 per share on the previous year and $12.47 per share two years ago.

C. H. Carlisle, president and general manager of the Canadian Goodyear company, referred to extensions made to properties during the year. These included the purchase of warehouse and office building in Vancouver, the building of an office and warehouse in Saskatoon, extension of the mechanical goods factory at Bowmanville, extension to the power house at New Toronto plant, extension to the cotton plant at Ste. Hyacinthe. The addition to the cotton plant should be in operation by February 1, 1930. The plant will have a capacity of 45,000 spindles and will be one of the best equipped plants of its kind in Canada.

J. E. Stephenson, British Columbia manager of the Goodyear Tire & Rubber Co., Ltd., branch at Vancouver, has just returned to his office after a trip east. While in eastern Canada he attended a branch managers' conference at Toronto, Ont., and stated that the past year was one of the most successful in the history of the firm.

Miner Rubber Co., Ltd., Montreal, P. Q., had a most attractive display at the recent Produced in Canada Exhibition, a national exhibition for Montreal, representing the manufactured and national products of Canada, grouped by industries, and sponsored by the Produced in Canada Association (Quebec) Inc.

W. H. Miner, president of the Miner Rubber Co., Ltd., and J. C. Blanchard, manager, are at present in Europe in the interest of the firm's export business. They are accompanied by their export salesman D. Macaulay.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., has patented a double-treaded tire advertised as "Cleated-Grip," and claimed by its makers to have both an unusually high safety factor and a big reserve of extra mileage. It gains these qualities from a second tread of thick, tough rubber cleats molded on top of the regular Dunlop non-skid tread.

The Dunlop company had as dinner guests at the Royal York Hotel those who attended the seventeenth annual sales convention of the Canada Cycle & Motor Co., Ltd. D. E. Rogerson was chairman at the dinner and introduced Mr. Martin, Dunlop's general sales manager.

J. Erle Jones, sales manager of the mechanical division of Dunlop Tire & Rubber Goods Co., Ltd., has returned from a six-week business trip on the Western Coast.

The Durable Mat Co. of Canada, Ltd. This is one of the newest industries in Victoria, B. C., and it has just closed its second year of operation with a record of satisfactory growth and profit. The company was formed by ex-Mayor J. C. Pendray and a group of Victoria business men to manufacture mats from reclaimed automobile tires.

The Rubber Industry in Europe

GREAT BRITAIN

Dutch Plan Fails

It is doubtful whether anyone really is surprised at the virtual failure of the Dutch scheme for stabilizing rubber. Even in Holland the majority of important rubber producers held aloof, and among those who did attempt to cooperate some disagreed on certain points in the scheme. It is well to remember at this time that the majority of Dutch rubber producers has never been in favor of regulating the production and marketing of rubber, and that it is always the same small group that busies itself with schemes of the kind.

In England the proposals were viewed with a mixture of indifference as regards the possibility of cooperation, and unfeigned delight on the part of many because the Dutch were being paid back in their own coin. The following remarks from the London *Rubber Age* reflect the average opinion on the subject here:

"When the British Government, in a moment of panic, carefully engineered by American agencies, decided that restriction must go, the effect was to hit the British companies hard, but it hit the Dutch harder. And for a good reason. The Dutch had been tapping furiously and had no surplus accumulation which they could realize to swell income.....What then is the upshot of the situation in which the Dutch companies find themselves? A complete reversal of relative positions. Having turned down every proposal for cooperation from Great Britain, they are now suggesting some arrangement with British producers to escape the consequences of their previous attitude of independence.....Our Dutch friends.....must not be surprised if we look at their proposals with the same caution.....that they brought to bear on our proposals in other circumstances. There is nothing in the present situation which gives the British producer very serious anxiety. All the portents favor in the not too distant future an approximation of demand to output with better rubber prices. British producers are not tumbling over each other as they did twelve or more months ago, before they realized their own strength, to sell forward at any figure likely to cover working costs."

Elsewhere, the same paper discusses further the relative positions of the British and Dutch rubber producers as follows:

"On the whole we should say that Malaya has come through the ordeal to better advantage than Sumatra. If so, the deduction will not be unnatural that British rubber plantation companies are.....in a stronger position to face the future than the Dutch.....Taking recent reports at random, we find that Central Sumatra, though it maintained its dividend at 7½ per cent, shows profits down from £8,506 to £5,900. Sungei Buaya (Sumatra) is not able to repeat its 5 per cent dividend, its profits of £22,524 having fallen to £5,390. Most Malayan reports.....tell a different story. Tali Ayer's profits increased from £25,762 to £37,565, and its dividend doubled at 10 per cent. Batuk Rabit increased its profits from £9,899 to £10,167, and its dividend from 7½ to 10 per cent. Hoscote (Malaya) made a jump in profits from £410 to £10,698. Karmen profits were £8,152 against £2,769 and a dividend of 5 per cent is paid against nil. Sengat made £6,768 in 1927-28 and £16,276 in 1928-29; Behok Consolidated earned £20,326 against £3,069 and declares 5 per cent against nil. Jong Landor increases its dividend from 4 to 12½ per cent. Merlimau Pegoh and F. M. S. Rubber both declare 5 per cent interim against nil last year, and Sungei Tukong enters the list of dividend payers with 4 per cent as the result of a profit of £5,596 against £2,274."

A desire for retaliation plus the feeling that the British are in a very much stronger position than the Dutch, therefore, characterizes the present British attitude and on the basis of this it may be fairly safe to predict that no scheme for stabilizing the rubber industry emanating from the Dutch will be seriously considered by the British, unless of course the Dutch should succeed in devising some scheme that impresses the British as being infallible while it at the same time carries the universal support of the Dutch producers.

Forward Sales

In a recent issue of the *Financial Times* the question of forward sales is discussed, and the fact that the forward contracts outstanding for 1930 are comparatively few and in the majority of cases have been made at prices well above present levels, is brought to the fore. From statistics compiled by this paper it seems that about 350 contracts are still to be completed, and that of these only 67 will be outstanding at the end of 1929. With the exception of about half a dozen contracts the few contracts for 1930 and 1931 are at prices ranging between 1 shilling and 2 shillings 3 pence per pound.

It is finally being realized that producers played into the hands of American buyers when they made large forward contracts at a time when prices were practically at cost price level. But American purchasers have not been given the same opportunity for 1930 and proof of their anxiety to bring about conditions similar to those of the current year is found in the rumors that they have recently offered to purchase the whole of the output of one of the largest producing groups at a price of 1 shilling per pound for the next five or ten years. This offer was refused, it seems; indeed, it has been noted in Mincing Lane that sellers of the Jan.-Dec., 1930, deliveries have been difficult to find. It is considered doubtful here whether America has covered more than one-tenth of her requirements for the spring trade, let alone anything for further forward delivery. For this reason alone producers should view the future optimistically and not allow themselves to be deluded into panicky selling, for all the rubber that will be produced will be needed in the first half of the coming year.

More Optimism

It is not the above condition alone that makes for optimism at the present time despite the sinking prices and the uncertainty created by the happenings on the American Stock Exchange. A new development is being closely watched and that is the growth of the rubber industry on the continent of Europe. Brokers mention it in their market reviews and chairmen of rubber producing companies speak of it in their reports. Thus Charles Emerson at the meeting of the Kamuning (Perak) Rubber & Tin Co., pointed out that while America was still the principal consumer, European consumption has advanced in welcome volume this year. To the end of August the Continent absorbed 161,500 tons as against 109,048 tons for the corresponding period of 1928, an increase of 48 per cent.

At the twenty-first anniversary of Harrisons & Crosfield the chairman, Eric Miller, reviewing the rubber industry, stated: "The proportion of the world total absorbed outside of the United States used to be 30 per cent, and this has gradually risen to 40 per cent with a definite tendency to rise further."

"To my mind," he says, "the record of this year's consumption is of far greater significance than the increase in production. Many people, in retrospect, have deplored the rise in price which occurred in 1925 and which was undoubtedly responsible for the planting up of considerable areas of rubber, the development of which would otherwise have been deferred; but without these extensions the world would be facing a shortage."

Institution of Rubber Industry

A meeting of the Birmingham and District Section of the Institution of the Rubber Industry was held at the end of October when a paper on "Some Properties of Carbon Black" was read by Dr. D. Parkinson. Dr. D. F. Twiss presided. The sixth annual meeting of the Manchester and District Section was held on October 24 in Manchester for the election of committees. A paper on "The Application of Electricity to the Rubber Industry" was read by F. Walker.

Olympia Exhibition

A number of manufacturers of tires and rubber accessories for automobiles again exhibited at the motor show held this year. A feature was the number and variety of ways in which rubber was used in connection with automobiles, excluding tires. Much propaganda was made for rubber upholstery and rubber for insulating purposes. As for the tire exhibits, there did not seem to be much that was strictly speaking new. The Avon India Rubber Co., Ltd., showed among other products a new buttressed tread designed for the 30 by 4.50 Ford, and other drop-center rim sizes, but not the beaded edge types. The Dominion Rubber Co. also has a new tread with buttressed walls. A feature of the tread is its convex contour, which gives a wide tread area and makes for easy steering. The Dunlop Rubber Co., Ltd., showed four new "Clipper" models besides a variety of Dunlop wheels. The first British Firestone tires were displayed by the Firestone Tire & Rubber Co. Goodyear and Goodrich also showed tires made in England. The main attraction at the stand of the Hutchinson Etablissements was the Paxon air cushion, by Paxon, Ltd., Blythe Road, Hammersmith, W. In this cushion non-extensible rubber material is used for the top and sides and very elastic rubber for the bottom; two or more ribs extend from top to bottom over the whole width of the cushion, thus forming inter-communicating air chambers. The cushion is supported on a patent grid consisting of rubber strips fixed to a bottomless and specially shaped wooden frame.

The new Lynton segment rim for wire wheels was displayed by the Lynton Wheel & Tire Co. Incidentally, it was noted that a large number of wire wheels were shown, these wheels having the advantage over other types that they are so much lighter and better looking. Other manufacturers represented at this show included India Tyre & Rubber Co. (Great Britain), Ltd., (the first Scottish made tires were shown,) Ioco Rubber & Waterproofing Co., Ltd., David Moseley & Sons, Ltd., Palmer Tyre, Ltd., Pirelli, Ltd., Sorbo Rubber Sponge Products, Ltd., Trowbridge Tyre & Rubber Co., Ltd., etc.

GERMANY

New Caterpillar Tire

This new type of tread consists of an endless band studded with diamond-shaped bosses of rubber which are wider in the driving direction than in the cross direction, so that when brought in motion, they offer sufficient resistance in the former direction, while yielding to a certain extent in the opposite direction, thus turning aside laterally, which makes steering possible. The bands are intended for use on large tractors, trucks, busses, trailers, furniture vans, etc.

Cable Kartels

Two kartels of the German cable industry have headquarters in Berlin. While these organizations do not actually sell the products of member firms, they set prices. During the last few years the kartels have become very strong; they dominate the market, and competition from outside firms is negligible.

While the industry, as far as price fixing is concerned, therefore is sufficiently well protected, nevertheless it cannot be said that its position is altogether satisfactory. Business, particularly in regard to local demand, has been slow, and still further slackening in demand is expected for home consumption as the winter approaches; so the possibility of reducing operations has to be faced.

On the other hand, the export trade in German cables has been developing in a gratifying manner. In 1927, the total amount of cable exported was 42,000 tons, representing an approximate value of 40,000,000 marks. In 1928 this increased to 49,000 tons, value about 47,000,000 marks. For the first seven months of 1929 exports have already reached 33,500 tons, value about 35,000,000 marks.

A new organization representing the joint interests of several leading cable manufacturing firms was formed in Berlin a short while ago. It is understood that the following ten firms which manufacture cables only have joined: Deutsche Kabelwerke, I. C. Vogel, Norddeutsche Kabelwerke, Dr. Cassirer, Hackethal, Kabelwerk Neumeyer in Nurnberg, Kabelwerke Duisburg, Kabelwerk Rheydt, Suddeutsche Kabelwerke, Kabelwerke Osnabruck, and Osnabrucker Draht-und Kabelwerke. Since most of these firms belong to the kartels mentioned above, the latter are in no way affected by the new organization.

Kleiber's Synthetic Rubber

The claims of a Swiss chemist named Kleiber regarding his synthetic rubber process are being widely discussed in the local papers. The new synthetic rubber is prepared from crude oil at a cost of 85 centimes per kilo, and is said to be even more elastic than crude rubber. One Berlin paper went so far as to accuse the inventor of smuggling natural rubber into his product. But in the meantime the paper has had to retract that statement and publish a correction. The *Gummi-Zeitung* has received a communication from inventor Kleiber and his lawyer, Gilardi, of Lugano, which declares that demonstrations of the process were held in the presence of Dr. Werner Esch, of Hamburg, and Dr. Rudolf Ditmar, of Graz, as well as of representatives of the Society for Chemical Industry, Basle, and that they have not found Kleiber's invention to be a sensational bluff.

Dr. Ditmar confirms the correctness of the process which he witnessed from beginning to end, and Dr. Esch was convinced by the successful hot and cold vulcanizations that the product was a rubberlike article that could be vulcanized like natural rubber.

As mentioned before, the basis of the product is crude oil. Its advantages as compared with natural rubber are: it mixes more readily with other ingredients, cures more rapidly, and is more easily soluble. According to the communication in question, the cost price at present is 85 centimes per kilo (about 17 cents for 2.2 pounds), but this would be reduced with large-scale production. The article has been produced not only on a laboratory scale but at the rate of about 10 kilos (22 pounds) per day, and plans have already been started for increasing the output to 150 kilos per day. The *Gummi-Zeitung*, therefore, thinks that this invention will have to be taken somewhat more seriously and further developments awaited.

Seiberling-Fulda Agreement

It is reported that negotiations carried on in Holland between F. A. Seiberling, president of the Seiberling Rubber Co., Akron, O., and General Director Eichholz, of the Gummiwerke Fulda, have led to an arrangement by which the two firms will work together. This it seems has been confirmed by a wireless from New York on Mr. Seiberling's return to America. The Gummiwerke Fulda will retain its independence in all ways and will continue to supply first class German goods.

Flugel & Polter Anniversary

On October 23, 1929, Flugel & Polter, of Leipzig-Plagwitz, celebrated its fiftieth birthday. The enterprise was started in 1879 by Richard Otto Flugel, who made dress shields on a very small scale. However, he was successful from the start and the business increased so rapidly that for its proper development he soon found it necessary to obtain additional resources. In 1882, therefore, he entered into partnership with Hans Polter. Having outgrown the old premises, they equipped a factory where not only dress shields but nipples, tubes, and hard rubber goods were made. Business continued to increase necessitating additions to building and equipment. New goods were added from time to time: rubberized fabrics, seamless goods, surgical soft rubber goods, belts, balls, mineralized rubber articles. A high standard of perfection has been aimed at, and the firm's bathing caps and novelties are well known. At present the concern, which employs about 300 persons, is under the direction of Paul Lucas, the founder of the business having died in 1917.

Crude Rubber Imports

Crude rubber imports into Germany continue to increase. In September, 1929, the total amount was 47,979 quintals, valued at 9,106,000 marks, as compared with 40,533 quintals valued at 8,569,000 marks in the same month of 1928. For the first nine months of 1929, the total is 421,207 quintals, valued at 81,875,000 marks, against 309,575 quintals, valued at 86,713,000 marks in the corresponding period last year, an increase for 1929 of 35 per cent.

The Rubber Industry in the Far East

MALAYA

The Production Question

The puzzle of the hour is what is Malayan production of rubber for the current year, and how much of the swollen shipments represents hoarded stocks that have not yet been worked off? Up to a few months ago 30,000 tons a month was regarded as a pretty safe estimate, but later shipments have worked havoc with calculations. The difficulty in judging the present situation is that there are no adequate statistics available. The European companies and some of the larger Chinese concerns publish outputs, but data concerning the very large number of small native producers are very sparse indeed. The *India Rubber Journal* has gathered production figures from 263 estates owned by British companies in Malaya from November, 1928, to August, 1929, which show that the crop for this period increased 50 per cent as compared with the same period for 1927-28. This cannot be considered excessive especially when the increase for August, 1929, as compared with the same month of the previous year, was only 15 per cent, whereas the increases in the early months of the current year were over 100 per cent.

When it is further remembered that we are dealing with crops from areas which are supposed to have been rested over 30 to 40 per cent for rather lengthy periods during restriction, and that these areas are now on a 100 per cent producing basis instead of 60 per cent as in 1928, the increase is really surprisingly small, so that as far as the European estates are concerned, or at least a very large part of them, it does not seem plausible to ascribe the huge shipments to unexpectedly large outputs.

Turning to the Asiatic holdings, we now know that they play a far more important role in the production of rubber in Malaya than has generally been supposed to be the case. Such figures as are available lead to the conclusion that at least 50 per cent of Malayan rubber comes from Asiatic estates and small holdings. Production figures for these small holdings that would be of any use for the present considerations are not available, but it would be interesting to know whether estimates of Malayan production have included the 30,000 tons of rubber that natives were said to have smuggled annually out of Malaya during restriction, reshipping it to Malaya as Dutch native rubber.

Again it may be remembered that there were rumors at the time that large estates were in the habit of buying export rights from the small native holders with which to cover their own excess exports, while the natives in these cases frequently left their own gardens untapped. And finally, it will also be remembered that there were a good many complaints from small holders, native and some European, that they had been grossly under-assessed and were able to produce considerably more than the arbitrary amount fixed for them since they had no books to show what their areas were capable of producing.

If the talk about the smuggling and the coupon traffic could be proved to be largely true, and furthermore the complaints of the small holders found not to be without ground, then we should have to decide that perhaps after all Malaya's output has just naturally increased until 400,000 tons per annum is a normal figure.

Dutch Native Rubber

In consideration of future rubber supplies, Dutch native rubber is now acknowledged an important factor, although there is still a tendency to minimize its significance as much as possible. Thus when there is talk of the large extensions in native planting that have taken place, and it is deduced that a corresponding increase in output may be expected, it is always asserted that most of this new planting is replacement of trees that have been killed by overtapping and that for this reason alone no great increases need be looked for. Even if this were not the case, the native is unable to produce much rubber when the price is below a certain figure at which, however, the European grower can still produce at a profit.

These arguments were also used when in the early years of restriction it was suddenly called to the attention of producers that Dutch native rubber exports were about 30,000 tons. At that time it was confidentially stated that native outputs would never reach more than 50,000 tons a year. Dr. Rutgers' estimate that by 1930 the natives would be producing about 150,000 tons a year was considered rather ridiculous. But statistics compiled by the Registrar of Imports and Exports for Malaya show that the total imports of foreign rubber during the first nine months of the present year amounted to 124,354 tons against 115,626 tons during the same period of the preceding year. That is, so far, an increase in spite of low prices.

But there is more. If the smuggling rumors mentioned above were well founded and 30,000 tons of native rubber imports listed as coming from the Dutch colonies were actually smuggled Malayan rubber, the increase in Dutch native rubber outputs becomes that much greater and accordingly much more significant. It would show that a low price was not a very effective curb on this kind of production, also that extensions have been even greater than has been believed, or that the trees somehow manage to survive severe handling, or more important still, that the trees are not so universally and savagely overtapped as the European producer likes to imagine.

Probably all these have something to do with the big native rubber outputs. In any case it is worth remembering that probably 50 *per cent* of *all the rubber produced in the East* comes from *Asiatic holdings.*

Navillus' Ofe Scheme

What may be considered to be one of the most original schemes submitted for the stabilization of rubber has recently been published in the *Straits Budget.* It is known as the Navillus' Ofe scheme and aims at control of surplus only. It is assumed that a number of producers referred to as the Group have combined to operate the Navillus' Ofe scheme and that on December 31 of a given year the Group's estimate for the coming twelve months is:

	Tons Per Month Average
Production by Group, cost up to 7d....	6,000
Production by "A," cost up to 13d....	51,000
Production required for consumption, cost up to 13d	57,000
Production by "B," cost over 13d.....	3,000
Maximum world production	60,000
Minimum world consumption	57,000
Maximum world surplus	3,000

The Group's idea is to stabilize the price at 13 pence because 13 pence will not protect producers whose cost is 13 pence or higher, and because in this way producers "B", whose 3,000 tons are not needed, will be shut off the market. If producers "A" wish to raise prices above 13 pence, they will have to form a separate organization. On January 1, world stocks are estimated to be four months' consumption held by—

	In Store Tons	In Transit Tons	Total Tons
Consumers	57,000	57,000	114,000
Non-consumers	111,000	3,000	114,000
	168,000	60,000	228,000

Say the price of rubber landed in London is (a) delivery Jan., buyers at 10 pence, sellers at 10.125 pence; (b), delivery Feb.-Dec., buyers at 10.5625 pence, sellers at 10.6875 pence. Then throughout Jan., the Group, having sold forward nothing for delivery after Jan. 31, are sellers at 13 pence, for delivery in London, at the rate of 6,000 tons per month during Feb. onward or buyers at market price up to 13 pence of all rubber offered for the same delivery.

All purchases would be so arranged to disguise the fact that the Group was the buyer.

It is obvious that if the Group cannot buy at 13 pence, there must be other buyers at more, and the Group sells above 13 pence; while if the Group cannot sell at

13 pence, there must be other sellers at less, and the Group buys below 13 pence. It is therefore assumed that the Group produces 6,000 tons during January but sells nothing and buys 66,000 tons at a maximum price of 13 pence, for delivery in London, at the rate of 6,000 tons per month, during Feb. to Dec. Then the position in London during Feb. would be:

	Tons
Rubber required for consumption.....	57,000
Rubber purchased by the Group.....	6,000
Total rubber required for February delivery	63,000
Against which February arrivals are.	
January production "A" (see above)....	51,000
February shortage, artificial	12,000
Group's stock of January production—held off the market—in London (see above).	6,000
February shortage, actual.....	6,000

This February position would be repeated every month during March to December, and onward, as long as the Group can find sellers of forward rubber at 13 pence or less. An actual shortage of 12,000 tons a month (6,000 tons physical and 6,000 tons paper rubber) every month from February to December, may send the price up to 56 pence as in 1925, and even if the Group puts enough of its own production on the market to bring the supplies up to the level of consumption, the price ought not to fall below 20 pence. And in the latter event the Group could afford to sell 66,000 tons own production at 6 pence a pound and still realize 13 pence on their whole output. The price could of course always be varied, and the Group could go down to 7 pence per pound without loss to itself.

NETHERLANDS EAST INDIES

Crosses of Hevea Trees

In an article on "Tapping Results and Other Observations Concerning Crosses of Hevea Trees in the Experimental Garden of Soengei Pantjoer," by Dr. C. Heusser, which was issued in Communications from the General Experiment Station of the A. V. R. O. S. (General Association of East Coast Sumatra Rubber Planters), Rubber Series No. 71, a detailed report is given of the work in question.

The crosses under discussion with two exceptions were made between March and May, 1920, and the resulting seeds were harvested in August-October, 1920, and planted out in nurseries at the experimental station. In October, 1921-January, 1922, the seedlings, approximately one year old, were planted out as stumps in the experimental garden of Soengei Pantjoer after the majority had been marcotted. A total of 1,691 stumps were planted out belonging to thirty different combinations among sixteen different mother trees. The number of trees per cross varies considerably, and some groups are represented by only a few individuals. This is due to the low percentage of successes in pollination and the barrenness of the trees. Of the trees originally planted 1,450 were still in existence at the end of the third tapping year; the loss of more than 15 per cent occurred in the first years and was partly due to unsuccessful plants and partly to root diseases. On one block where *Cassia Siamea* had previously grown, the loss due to root disease was 40 per cent.

Tapping was begun in November, 1925, four years after planting out the stumps, or five years after harvesting the seeds. The trees were considered tappable when they had a circumference of 40cm. or over, at a height of 1 meter. The tapping system was a left cut over one-third, at an angle of 30 degrees, alternate monthly. No tapping was done on Sundays so that the number of tapping days was reduced to 150-155, or 45 per cent of the tappings with a daily system.

The annual average yield per tree per cut was found to be 7.78 grams dry in the first year, 18.63 for the second, and 20.24 for the third year. The yield for the first year is not much higher than that on an average, good plantation, owing to the greater planting distance. In the second tapping year, the yield advances considerably; in the third year there is again an increase, but not in the same proportion, which may be ascribed to the change over to a new panel.

These yields justify the assumption that with seed selection higher yields can be obtained even in the first generation. However, these good results do not simplify the selection problem. For the analysis of the families shows that besides high producing crosses there are also some which are not much better than ordinary seedlings, a fact that could not have been foretold from the outputs of the mother trees. The experimental tappings, therefore, only demonstrate that the possibility of obtaining high yielding seedlings from good mother trees is great.

Variable Yields

Examination of the families has also proved that great differences occur in the variability of the yields of trees of the same family. In some families the trees give a comparatively uniform yield; while in others the individual yields show considerable variations.

The families also show differences in the degree of increase in yield during the three tapping years, a difference more pronounced in the case of individual trees than of families. Thus some trees appeared to be average yielders in the first tapping year, but in the second and third, ranked among the best. On the other hand some which had been conspicuously good producers in the first year did not give the yields expected in later years.

Secondary Characteristics

The secondary characteristics such as bark thickness, development, susceptibility to brown bast, etc., have been found to be hereditary to a considerable degree. These factors of course merit special attention.

The ideal cross has not yet been found, which is not surprising in view of the complexity of the problem. However, mother tree 157 may be considered a good seed-bearing tree. The offspring from this tree, in five different combinations, gave the highest average yields, and the variation in yield per tree is small in this family. However, an important drawback was found in the case of one cross, 157 x 164, the offspring of which among other undesirable characteristics, have a marked tendency to develop brown bast (12 per cent). There are indications that 164 was responsible for introducing the susceptibility to brown bast; at any rate, further experimentation with 157 is called for. Another good tree with outstanding qualities is 161. Some of its offspring are among the best yielders in the experimental garden.

Curiously enough, while this family shows unusually robust growth and great thickness of bark, the members are singularly susceptible to brown bast and the individual tree yields very considerably.

Conclusions

From the results of the experiments, Dr. Heusser concludes that while on the average, yields from seedlings are inferior to those to be expected from buddings of the best clones, yields from seedlings of the best families approximate those from clones. If seed from one of the crossings of 157 were available, this could be considered equal to buddings as planting material, seeing that by selective thinning the average can be increased, which is not possible to the same degree with buddings. Once seed is available from the seed gardens to be established, the slogan will no longer be "Buddings Against Seedling," but "Seedlings and Buddings." And the latter slogan will hold good for many years to come, because the limit of possibilities with budding has not yet been attained.

Native Rubber in Djambi and Palembang

According to an interview with a rubber expert just returned from Djambi and Palembang, which was published in the *Java Bode*, the first thing to strike his attention was the improved quality of the rubber now produced by the natives. The reason for this is the strict supervision that is exercised in order to prevent the flagrant adulteration that used to be so prevalent here. It was nothing unusual to find lumps of iron, old shoes, and similar articles in the middle of a thick cake of rubber, put in to increase the weight of the rubber. All this has now been changed.

Another improvement was noted in tapping and care of the plantings. The agricultural experts sent out by the Department of Agriculture are doing good work among the natives, instructing them in better methods of cultivation and tapping. Mention was made of the enormous areas of rubber that have recently been planted by the natives and that are not yet tappable. However, the chronic shortage of labor is a serious check on native output, which—if there has been no misprint—the authority in question considers may well reach 500,000 tons.

Rubber Patents, Trade Marks and Designs

Machinery

United States

1,730,639.* Hose Vulcanizer. Designed for vulcanizing hose under internal fluid pressure, distending and shaping the hose against an external lead casing or sheath. E. Blaker, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,730,657.* Calender. Spacing and guiding a series of parallel strands of material in the production of weftless cord tire fabric by calendering rubber onto a set of cords. J. F. Hogan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,731,006.* Molding Apparatus. Convenient and economical handling of articles that have been given final form by extrusion of stock into mold cavities and putting them under high pressure therein without entrapping air and without much overflow. J. O. Goodwin and C. W. Leguillon, Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

1,731,024.* Shoe Press. Pressing rubber overshoes mounted upon lasts to consolidate their parts and expel contained air preparatory to vulcanization in open heat. C. M. Richardson, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,731,132.* Tire Patch Cutter. This cuts from the tire, or other strip fed into it, patches as are employed in repairing tires. A. R. and C. Hendry, both of Passaic, N. J.

1,731,537.* Stock Feeding Device. For feeding sticky and hard-to-handle material as rubber stock from one machine to another. A. R. Krause, assignor to Gillette Rubber Co., both of Eau Claire, Wis.

* Pictured in group illustration.

1,731,754.* Artificial Leather Apparatus. Rubber-fiber sheeting is reenforced, then dried and vulcanized to effect tenacious bonding of the fabric. T. G. Richards, Cambridge, Mass., assignor to Dispersions Process, Inc., Dover, Del.

1,732,194.* Tire Building Drum. A quick acting, collapsible drum for building tires in semi-flat form. T. A. Miller, assignor to Akron Standard Mold Co., both of Akron, O.

1,732,618.* Strainer Head. An improved strainer head for extruding machines. V. Royle, Paterson, N. J.

1,732,704.* Cutting Machine. Transversely cutting a web of material, preferably on the bias, into successive sections. J. Wegner, Astoria, assignor to Spadone Machine Co., Inc., New York, both in N. Y.

1,732,759.* Band-Making Machine. Assembling component parts of bands for pneumatic tire building. E. F. Maas and E. G. Templeton, assignors to Goodyear Tire & Rubber Co., all of Akron, O.

1,732,778.* Airbag Inserter. Flat-built tire bands are shaped and airbags inserted in a single cycle of operation. R. W. Snyder, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,729,716 and 1,729,717. Ball Machine. J. R. Gammeter, Akron, O., assignor to A. G. Spalding & Bros., a corporation of N. J.

1,729,996. Press. J. Carroll, Brooklyn, assignor to Spadone Machine Co., Inc., New York, both in N. Y.

1,730,213. Tire Building Core. F. L. Johnson, Akron, O.

1,730,307. Stock Assembling Device. W. C. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,730,313. Footwear Machine. W. W. Benner, Cuyahoga Falls, O., assignor to Firestone-Apsley Rubber Co., Hudson, Mass.

1,730,560. Automatic Cutting Device. M. Castricum and P. L. Butterfield, both of Springfield, assignors to Fisk Rubber Co., Chicopee Falls, all in Mass.

1,730,572. Bead Ring Device. R. Hansen, Cudahy, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,730,583. Building Clincher Tires. M. A. Marquette, assignor to Fisk Rubber Co., both of Chicopee Falls, Mass.

1,730,585. Bias Cutter. T. Midgley, Hampden, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,730,621. Tire Building Member. H. I. Morris, assignor to Yoder-Morris Co., both of Cleveland, O.

1,730,638. Tube Dusting Apparatus. H. L. Young, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,730,647. Transmission Belt Machine. E. E. Davidson, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

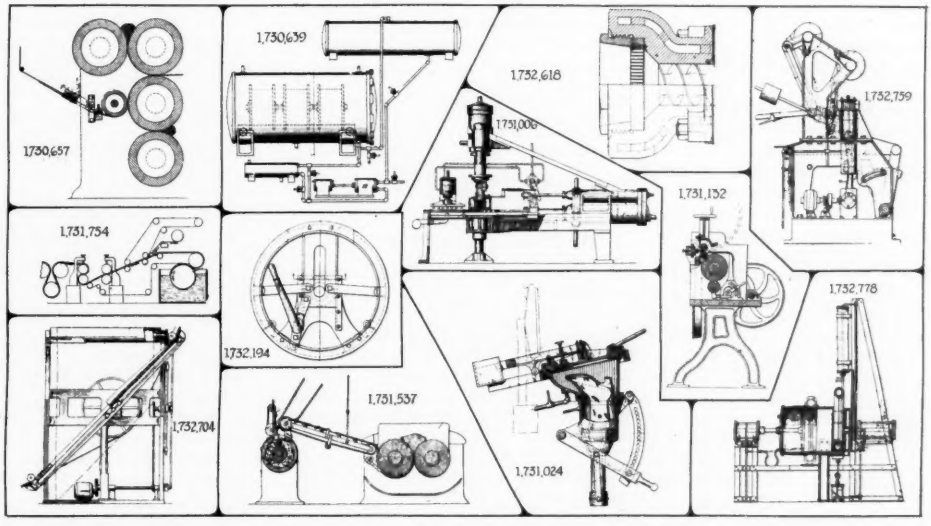
1,730,650. Hole Finishing Apparatus. B. A. Evans, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,730,651. Core Inserting Apparatus. R. E. Flaherty, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,730,673. Variegated Sheet Machine. T. J. Mell, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,730,760. Collapsible Core. B. De Mattia, Garfield, N. J., assignor, by mesne assignments, to National Rubber Machinery Co., Akron, O.

1,730,821. Rubber Cutter. F. Kempter, Stuttgart, Germany.



1,730,991. TUBE WASTE TRIMMER. F. J. Benson and G. H. Lewis, assignors to Fisk Rubber Co., all of Chicopee Falls, Mass.

1,731,010. TUBE DRILL. A. R. Krause and H. O. Hutchens, assignors to Gillette Rubber Co., all of Eau Claire, Wis.

1,731,026 and 1,731,027. TIRE MACHINE. M. C. Scrote, Kenmore, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,731,713. STOCK PICK-UP DEVICE. H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,731,817. TIRE BUILDING DRUM. C. B. Hudson, assignor to Akron Standard Mold Co., both of Akron, O.

1,732,148. CUTTER MECHANISM. W. R. Barrett, New York, N. Y.

1,732,149. FABRIC CUTTER. W. R. Barrett, New York, N. Y.

1,732,525. TIRE BUILDING MACHINE. H. I. Morris, assignor to Cord Tire Machine Co., both of Cleveland, O.

1,732,776. APPLYING STRIPS TO BEADS. J. A. Shively, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,732,781. TUBE APPARATUS. J. B. Tiffany, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,732,931. TIRE BUILDING CORE. H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,733,064. TIRE MOLD. H. M. Lambert, Portland, Ore.; H. H. Lambert, executrix of said H. M. Lambert, deceased, assignor to Lambert Tire & Rubber Co., Barberton, O.

Dominion of Canada

293,818. TUBE DEFLATING MACHINE. Goodyear Tire & Rubber Co., assignee of W. H. Campbell, both of Akron, O., U. S. A.

United Kingdom

316,134.† COMPOUND SHEET MATERIAL. P. Pick, New York, N. Y., U. S. A.

316,170. REPAIR VULCANIZER. D. and R. Stambois (representatives of L. J. Stambois), and A. A. Stamboise, all of London.

316,335. IMPREGNATING WITH LATEX. P. H. Head, Attenborough, Nottinghamshire.

316,353. ATTACHING RUBBER TO METAL. H. F. W. Menzel, Northampton.

316,896. MOLDING AND VULCANIZING APPARATUS. Dunlop Rubber Co., Ltd., London, H. Willshaw, H. Smith, and F. G. Broadbent, all of Fort Dunlop, Birmingham.

316,904. BALL TESTING APPARATUS. Dunlop Rubber Co., Ltd., London, and T. Cropper, Fort Dunlop, Birmingham.

317,269. WEB WINDING MACHINE. G. C. Marks, London. (Cameron Machine Co., Brooklyn, N. Y., U. S. A.)

317,385. ATTACHING RUBBER TO METAL. Anode Rubber Co. (England), Ltd., London, and E. H. Hereford, Budapest, Hungary.

317,434.† PILE FABRIC MACHINE. Oryx Fabrics Corp., Newark, assignee of E. H. Ward, East Orange, both in N. J., U. S. A.

† Not yet accepted.

Germany

483,954. TIRE SPLITTING MACHINE. Maschinenfabrik Turner A. G., Frankfurt a. Main.

484,415. SECTIONAL TUBE MOLD. Goodyear Tire & Rubber Co., Akron, O., U. S. A. Represented by R. Heering, Berlin S. W. 61.

484,602. MACHINE FOR RUBBER MATS. Max Muller Maschinen und Formenfabrik, Hannover-Hainholz.

Designs

1,088,304. TIRE CORE. M. Szurau, Stuttgarter Platz 20, Berlin-Charlottenburg.

1,088,494. DEVICE FOR VULCANIZERS. Hydraulik G. m. b. H., Duisburg.

1,088,915. MOLD AND VULCANIZING APPARATUS. Dunlop Rubber Co., Ltd., London, England. Represented by M. M. and Dr. R. Wirth, C. Weihe, Dr. H. Weil, all of Frankfurt a. Main, and T. R. Koehnhorn and E. Noll, both of Berlin, S. W. 11.

1,088,919. BICYCLE TIRE VULCANIZER. Max Muller Machinen und Formenfabrik, Hannover-Hainholz.

1,089,548. CABLE BRAIDING MACHINE. Firma Rudolf Kampf, Barenstein, Bez. Chemnitz.

France

663,233. MACHINE FOR BUCK-SKIN CLOTH. A. Delarue.

664,154. GRINDING MACHINE. P. H. Sahores.

Austria

A5,623-28. TIRE REPAIR DEVICE. Dunlop Rubber Co., Ltd., London, England.

A7,794-27. FOOTWEAR REPAIR VULCANIZER. A. Szobel, Vienna.

Process

United States

1,730,259. PAVEMENT MANUFACTURE. C. Wright, assignor to Wright Rubber Products Co., both of Racine, Wis.

1,730,472. BUILDING FLOORS WITH DUCTS. T. E. Murray, Brooklyn, N. Y.

1,730,665. ARTICLE OF ORNAMENTATION. M. Lindenberg, New York, N. Y.

1,731,148. PRODUCING CARD CLOTH. W. Otto, Leisnig, Germany.

1,731,657. SHOE HEEL CORE. J. R. Gammeter, Akron, O.

1,732,793. PNEUMATIC TIRE CASING. B. Darrow, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

Dominion of Canada

293,220. DENTAL PLATE. H. F. Buttner, Wallace, Idaho, U. S. A.

293,786. ELASTICIZED FABRIC. Comfolastic Corp., New York, assignee of J. Mayer, Belle Harbor, both in N. Y., U. S. A.

United Kingdom

316,788. FINGERPRINTING. H. E. Pitman, St. Louis, Mo., U. S. A.

317,384. PRINTING ON BALLOONS. Anode Rubber Co. (England), Ltd., London, and E. H. Hereford, Budapest, Hungary.

317,461. SEAMING AND JOINTING. I. and L. Dorogi and Dr. Dorogi És Tarsa Gummigyár R-T., all of Budapest, Hungary.

317,620. TRANSFERRING DESIGNS. Callender's Cable & Construction Co., Ltd., London, and J. Bowyer, Leigh, Lancashire.

Germany

484,637. MANUFACTURE OF FOOTWEAR. Harburger Gummiwaren-Fabrik Phoenix A. G., Harburg, Elbe.

484,864. OBJECTS FROM AQUEOUS DISPERSIONS. Anode Rubber Co., Ltd., London, England. Represented by Drs. W. Karsten and C. Wiegand, Berlin S. W. 11.

484,894. ACID AND ALKALI-PROOF COVERS. F. Ahrens, Kuchenthalstrasse 26, Hildesheim, and Harzer Achsenwerke G. m. b. H., Bornum am Harz, Konigsdahlum, Post Bornum, Harz.

France

663,859. MANUFACTURING SOLES. R. C. D. Ragache, Rue du Vieux Pont, Vinay (Isère).

Chemical

United States

1,729,651. MANUFACTURE OF LATEX PRODUCT. E. A. Hauser, Frankfort-on-Main, Germany, assignor to K. D. P., Ltd., London, England.

1,729,706 and 1,729,707. RECLAIMED RUBBER. C. H. Campbell, Pittsburgh, Pa., assignor to American Glue Co., Boston, Mass.

1,729,708 and 1,729,709. RUBBER COMPOSITION. C. H. Campbell, Pittsburgh, Pa., assignor to American Glue Co., Boston, Mass.

1,730,009. PAPER MAKING PROCESS. A. L. Kennedy, Keene, N. H., assignor to Plastic, Inc., a corporation of N. H.

1,730,388. ACCELERATOR PROCESS. W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,730,485. RUBBER COMPOUNDING. M. C. Teague, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,730,518. COMPOUNDING LATEX. J. McGavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,730,536 and 1,730,537. MANUFACTURE OF SUBSTITUTED GUANIDINE. W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,730,702. RUBBER-LIKE MATERIAL. J. C. Wichmann, Los Angeles, Calif., assignor to Cactus Rubber Co. of America.

1,731,483 and 1,731,485. RUBBER COMPOSITION. H. L. Fisher, Leonia, N. J., and W. C. Geer, New Rochelle, assignors to B. F. Goodrich Co., New York, both in N. Y.

1,731,484 and 1,731,487. RUBBER COMPOSITION. W. C. Geer, New Rochelle, assignor to B. F. Goodrich Co., New York, both in N. Y.

1,731,488. THERMOPLASTIC COMPOSITION. H. L. Fisher, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,731,725. WATER DISPERSION PROCESS. W. B. Pratt, Wellesley, Mass., assignor to Dispersions Process, Inc., Dover, Del.

1,731,849. RUBBER COMPOSITION. W. C. Geer, New Rochelle, N. Y., and H. L. Fisher, Leonia, N. J., assignors to B. F. Goodrich Co., New York, N. Y.

1,732,027. AQUEOUS RUBBER DISPERSION. W. B. Pratt, Wellesley, Mass., assignor, by mesne assignments, to Dispersions Process, Inc., Dover, Del.

1,732,486. ACCELERATOR. W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,732,532. ACCELERATOR. D. H. Powers, assignor to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

1,732,770. ACCELERATOR. C. O. North, assignor to Rubber Service Laboratories Co., both of Akron, O.

1,732,774. RUBBER PRESERVATIVE. L. B. Sebrell, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,732,795. SYNTHETIC RUBBER. R. P. Dinsmore, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,732,886. RUBBER-METAL ADHESION. H. Gray, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,732,944. VULCANIZING METHOD. T. W. Miller, assignor to Faultless Rubber Co., both of Ashland, O.

Dominion of Canada

293,350. RUBBER PRODUCTION. I. G. Farbenindustrie A.G., Frankfort-on-Main, assignee of O. Schmidt, F. Hass, and G. Niemann, Ludwigshafen-on-Rhine, all in Germany.

294,186. ACID AND ALKALI RESISTANT. F. Ahrens, Bergsteinweg, and Harzer Achsenwerke G.m.b.H., Bornum am Harz, Konigsdahlum (Post Bornum an Harz), both in Germany, assignee of half the interest.

United Kingdom

316,251.† ANTIOXIDANT. Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.

316,496. TRANSPARENT SHEET. D. G. Carr, Sutton, Surrey, and C. J. Carr, Lancing, Sussex.

316,594. ELECTRODEPOSITING RUBBER. Anode Rubber Co. (England), Ltd., London. (P. Klein, Budapest, Hungary.)

316,692. VULCANIZING PROCESS. A. Carpmael, London. (I. G. Farbenindustrie A.G., Frankfort-on-Main, Germany.)

316,761. ACCELERATOR. Clayton Aniline Co., Ltd., Clayton, and R. Robinson, Withington, both in Manchester.

316,924. RUBBER-LATEX SEPARATION. Toto Co., Ltd., J. L. Buchanan, and S. P. Schatz, all in London.

316,932.† ACCELERATOR. Rubber Service Laboratories Co., Akron, O., assignee of W. Scott, Nitro, W. Va., both in the U. S. A.

317,030. SYNTHETIC RUBBER. A. Carpmael, London. (I. G. Farbenindustrie A.G., Frankfort-on-Main, Germany.)

317,129. TREATING LATEX. Dunlop Rubber Co., Ltd., London, E. A. Murphy and D. F. Twiss, both of Fort Dunlop, Birmingham.

317,145. PROOFING CLOTH. F. D. Toyne, Cam, near Dursley, and Hunt & Winterbotham, Ltd., Cam Mills, Dursley, Gloucestershire.

317,205. ACCELERATOR. Clayton Aniline Co., Ltd., Clayton, and R. Robinson, Withington, both in Manchester.

317,350. COATING SURFACES. Dunlop Rubber Co., Ltd., London, and E. E. White, Fort Dunlop, Birmingham.

317,435.† MOLDING PROCESS. Anode Rubber Co., Ltd., St. Peter's Port, Guernsey, Channel Islands, assignee of B. Dales, Akron, O., U. S. A.

317,655. RADIOACTIVE RUBBER. G. E. Heyl, London.

† Not yet accepted.

France

663,255. RUBBER VULCANIZATION. I. G. Farbenindustrie, A. G.

663,502. CONCENTRATION AND DRYING OF LIQUIDS. Anode Rubber Co. (England) Ltd.

663,995. LATEX-LIKE EMULSIONS. I. G. Farbenindustrie A. G.

General

United States

1,729,619. TIRE DEFLATION ALARM. L. P. Laro, Fresno, Calif.

1,729,636. WINDSHIELD WIPER. L. D. Vermette, Ludlow, Mass.

1,729,742. BOW NECKTIE. J. A. Hewes, Melrose, assignor to Hewes & Potter, Inc., Boston, both in Mass.

1,729,816. OVERSHOE. W. J. Binder, Trenton, N. J.

1,730,164. BROOM BRIDLE. H. and F. Reiser, both of Guttenberg, N. J.

1,730,202. DOUBLE STOPPER. H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,730,309. INFLATED BALL. I. I. Tubbs, Superior, assignor of one-half to G. F. Miller, Menominee, both in Wis.

1,730,493. KNEE PROTECTOR. E. A. Cooper, Kansas City, Mo.

1,730,576. CUSHION TIRE. F. R. Klaus and F. H. Meyer, assignors to The American Welding & Mfg. Co., all of Warren, O.

1,730,628. ARTIFICIAL FLOWER. S. H. Rogers, Cleveland, O.

1,730,752. COMPOSITE MATTRESS. W. A. Withers, assignor to Airubber Corp., both of Chicago, Ill.

1,730,804. COMPOSITE ARTICLE. G. E. Christenson, Jr., North Plainfield, N. J., assignor to Johns-Manville Corp., New York, N. Y.

1,730,983. MEDICAL SYRINGE. E. Sandig, assignor to the Firm Julius Friedlaender, Gummiwaren-Fabrik G. m. b. H., both of Berlin, Germany.

1,731,100. INVISIBLE GARTER. H. M. Herbener, Thomasville, Ga.

1,731,247. PNEUMATIC TIRE. O. J. Kuhlke, Akron, O.

1,731,321. ATTACHING HEELS. N. B. Riddle, St. Francisville, La.

1,731,336. PREFORMED RAIL FILLER. A. C. Fischer, Chicago, Ill., assignor to Philip Carey Mfg. Co., a corporation of O.

1,731,387. SEAT. A. F. Masury, assignor to International Motor Co., both of New York, N. Y.

1,731,412. SUPPORT. C. Froesch, Teaneck, N. J., assignor to International Motor Co., New York, N. Y.

1,731,729. SURGICAL IRRIGATOR. P. Schlumbohm, Berlin, Germany.

1,731,740 and 1,731,741. WATERPROOF SHOE. A. A. Glidden, Watertown, and W. R. Hickler, Weston, assignors to Hood Rubber Co., Watertown, all in Mass.

1,731,816. BOTTLE. N. K. Garhart, Watertown, assignor to Garhart Dental Specialty Co., Somerville, both in Mass.

1,731,852. RAILWAY VEHICLE. R. T. Glascodine, Westminster, London, England.

1,731,870. SOLID BAND TIRE. T. H. Rushton, Worksop, England.

1,731,958. JOURNAL BEARING. P. E. Wickstrom, assignor of one-half to C. C. Bateson, both of Seattle, Wash.

1,732,069. DRY CELL CONTAINER. A. W. Schorger, assignor to Burgess Battery Co., both of Madison, Wis.

1,732,158. STORAGE BATTERY CLOSURE. B. Ford, Philadelphia, Pa.

1,732,380. HEALTH APPLIANCE. D. Sarason, Munich, Germany.

1,732,440. MOLDED BOOT. A. A. Glidden and T. M. Knowland, assignors to Hood Rubber Co., all of Watertown, Mass.

1,732,671. SOLID TIRE. A. Brill, assignor to Republic Rubber Co., both of Youngstown, O.

1,732,933. STAIR TREAD. G. S. Frazier, Sebring, O.

Dominion of Canada

293,219. SCOURING DEVICE. J. J. Brell, New York, N. Y., U. S. A.

293,251. GARMENT HOLDING DEVICE. N. E. Kelk, Toronto, Ont.

293,367. TUMBLER CLEANER. Kleenglas (1929) Ltd., London, W. C. 2, assignee of Kleenglas, Ltd., London, S. W. 1, assignee of A. Griffiths, Rock Ferry, Co. of Chester, all in England.

293,368. ELECTRICAL CONDUCTOR. L. & N. Co., Ltd., assignee of V. N. Longtin, both of St. Johns, P. Q.

293,410. INFLATABLE ARTICLE. I. and L. Dorogi, assignors, and Dr. Dorogi És Tarsa Gummigyár R. T., assignee of one-half of the interest, all of Budapest, Hungary.

293,435. ATTACHING MARGINS TO DENTURES. F. W. Barbour, Toronto, Ont.

293,439. BRUSH. J. C. Boeckh, Toronto, Ont.

293,451. SYRINGE. B. F. Crisemberry, Indianapolis, Ind., U. S. A.

293,457. TIRE GAGE. C. H. Deren, Brooklyn, N. Y., U. S. A.

293,566. PREVENTING ELECTROLYTIC ACTION. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. Christophersen, East Orange, N. J., U. S. A.

293,584. TIRE NOZZLE AND GAGE. The Korect Air Meter Corp., Buffalo, assignee of L. A. Cherry, Kenmore, and V. H. Giles, Buffalo, all in N. Y., U. S. A.

293,610. PNEUMATIC TIRE. Schragin Puncture-Proof Tire Corp., Kings Co., assignee of K. Schragin, Brooklyn, both in N. Y., U. S. A.

293,658. TENNIS BALL. C. M. Ayres and J. H. Smith, both of Nuneaton, Warwickshire, England.

293,667. TIRE ALARM. H. Tastenhoye, Brussels, and F. Tastenhoye, Anderlecht, co-inventors, both in Belgium.

293,716. STIPPLE BRUSH. A. C. Sakowich, New Hyde Park, L. I., N. Y., U. S. A.

293,728. ANKLE SUPPORT. G. H. Wilkinson, Windsor, Ont.

293,789. ATTACHMENT PLUG CAP. Cutler-Hammer Mfg. Co., assignee of J. S. Coldwell, both of Milwaukee, Wis., U. S. A.

293,817. ANTISKID DEVICE. Goodyear Tire & Rubber Co., assignee of C. J. Burkley, both of Akron, O., U. S. A.

293,852. REVOLVING GRIZZLY. Robins Conveying Belt Co., Passaic, N. J., assignee of T. Robins, New York, N. Y., both in the U. S. A.

293,931. FOUNTAIN SWAB. R. A. Hendry, Toronto, Ont.

293,932. WINDOW ATTACHMENT. C. F. Hogelund, Minneapolis, Minn., U. S. A.

294,102. BANDAGE. J. Mahlein, Bronx, N. Y., U. S. A.

United Kingdom

316,069. ANTIFRICTION ROLLER. H. N. Barnes, London.

316,074. TOY BALLOON. G. Ingram, Old Ford, London.

316,087. INKSTAND. Avon India Rubber Co., Ltd., and T. L. Garner, both of Melksham, Wiltshire.

316,117. FLEXIBLE TANK. W. T. Caddy, Bognor, and D. Doig, London.

316,118. TIRE COVER. W. T. Caddy, Bognor, and D. Doig, London.

316,125.† DETACHABLE TREAD. Soc. Lagache et Glaszmann, Argenteuil, Seine-et-Oise, France.

316,142.† BEAD WIRE. Michelin et Cie., Clermont-Ferrand, Puy-de-Dome, France.

316,165. VEHICLE MUD GUARD, ETC. W. T. Caddy, Bognor, and D. Doig, London.

316,166. FLEXIBLE SHAFT COUPLING. W. T. Caddy, Bognor, and D. Doig, London.

316,201. VEHICLE SEAT. Dunlop Rubber Co., Ltd., London, and A. E. Harris, Fort Dunlop, Birmingham.

316,214.† TIRE GAGE. Compagnie Industrielle et Commerciale du Cycle et de L'Automobile, Paris, assignee of C. Dunois, Seine, both in France.

316,273.† VEHICLE LAMP. F. R. Dietrich, Pasing, Bavaria, Germany.

316,290.† PIPE COUPLING. Bühling & Böker Ges., Berlin, Germany.

316,297.† TIGHTENING BAND CLIPS. J. P. M. Malleville, Paris, France.

316,332. MICROPHONE. Burndept Wireless, Ltd., Aerial Works, Blackheath, and J. H. D. Ridley, South Norwood, both in London.

316,365. DRIVING BELT. R. Roderwald, Grunewald, Berlin, Germany.

316,441. WINDOW FRAME. H. G. W. Chichester-Miles, Harpenden, Hertfordshire.

316,445. MOTORCYCLE FOOT REST. Birmingham Small Arms Co., Ltd., and H. Briggs, Small Heath, Birmingham.

316,454. SWIMMING DRESS. W. Joberns, Wolverhampton.

316,461. FOOTWEAR. Liverpool Rubber Co., Ltd., and I. W. Davies, both of Walton, Liverpool.

316,489. WINDOW GUIDE. H. G. W. Chichester-Miles, Harpenden, Hertfordshire.

316,707. WOOD VENEER. R. Debains, Calvados, France.

316,727. PORTABLE IRRIGATOR. G. Thomas, Berlin, Germany.

316,739. AGRICULTURAL ROLLER. S. Norris, Taunton.

316,799. HEEL PROTECTOR. D. L. James, Eltham, London.

317,113. MOTORCYCLE HANDLE BAR. Dunlop Rubber Co., Ltd., London, and S. Sadler, Fort Dunlop, Birmingham.

317,256. FOOT ARCH SUPPORT. J. Mason, London.

317,534. DIAPHRAGM, VALVE, ETC. H. W. Hughes, Paddington, London.

317,563. HEAT INSULATED VESSEL. Lord Mayor, Aldermen, and Citizens of the City of Bradford, W. S. Howarth, and A. Watson, all in Bradford.

317,604. SURGICAL DILATOR. N. F. Pratt, Jacksonville, Fla., U. S. A.

† Not yet accepted.

317,671. FEEDING BOTTLE TEAT. C. Fervers, Cologne, Germany.

317,704. VALVE. R. A. and T. B. Blakeborough, both of Brighouse, Yorkshire.

Germany

483,976. PAVING BLOCK. J. S. Cowper, London, England. Represented by M. Wagner and Dr. G. Breitung, Berlin S. W. 11.

484,896. HANDLE FOR BATTERIES. Continental Rubber Works, Erie, Pa., U. S. A. Represented by E. Neubart, Berlin S. W. 61.

485,018. PACKING. William Doxford & Sons, Ltd., Sunderland, England. Represented by H. and M. Licht, Berlin S. W. 11.

Designs

1,088,513. TOOTHBRUSH HOLDER. F. Herrmann, Luisenufer 13, Berlin S. 42.

1,088,578. WRITING PAD. Osco-Gummiwarengesellschaft M. Thielmann, Giessen.

1,088,709. ELASTIC FABRIC. Vereinigte Gummiband-Webereien Tillmanns, Schniewind & Schmidt, Elberfeld.

1,088,719. SPONGE RUBBER EGG CUP. Gummiwerke Nordland A. G., Hamburg-Wandsbek.

1,088,910. CARPET. Otto Taube & Co., Kochstrasse 12, Berlin S. W. 68.

1,089,341. HAIR BINDER. G. A. Schulz, Bruckenstrasse 18, Heidelberg.

1,089,454. STOCKING. Julius Rompler A. G., Zeulenroda.

1,089,693. GYMNASTIC APPARATUS. E. Just, Cottbus.

1,089,771. COLOR BAND. F. Timme, Schonstrasse 26, Breslau 23.

1,090,003. HEEL. V. Grunvogel, Schwelm i. W.

1,090,011. ABDOMINAL BINDER. Firma F. Oscar Hartenstein, Carolastrasse 53, Plauen i. V.

1,090,017. COGGED BLOCK BELT. R. Roderwald, Menzelstrasse 9, Berlin-Grunewald.

1,090,356. PLAY BALL. Erste Badische Teigwerenfabrik Wilh. Hensel, G. m. b. H., Weinheim i. B.

1,090,399. NON-SKID TIRE. Continental Gummiwerke A. G., Hannover.

1,090,642. NIPPLE. F. Schiritz, Udostrasse 21, Gelsenkirche-Bulmke.

1,090,644. PNEUMATIC TIRE. Gummiwerke Fulda A. G., Fulda.

1,090,713. TUBING MACHINE. F. Tacke, Maschinenfabrik A. G., Rheine i. W.

Trade Marks

United States

262,187. BUFFALO. Combs. Hanover Rubber Co. "Excelsior" Inc., New York, N. Y.

262,188. Framed portrait of a woman's head. Shoes of leather, fabric, or combinations of these materials, and combinations of these materials and rubber. Chapline-Mayer Shoe Corp., Milwaukee, Wis.

262,191. Representation of a hide across and below which appear the words: "ENDICOTT JOHNSON FARM RELIEF AMERICA'S STANDARD." Boots, shoes, and slippers of leather, rubber, and/or fabric, or any combinations thereof. Endicott Johnson Corp., Endicott, N. Y.

262,195. Representation of a hide across and below which appear the words: "ENDICOTT JOHNSON ARCH SEAL AMERICA'S STANDARD ALL LEATHER FULL VAMP." Boots, shoes, and slippers of leather, rubber, and/or fabric, or any combination thereof. Endicott Johnson Corp., Endicott, N. Y.

262,235. TOWN TALK. Shoes, sandals, and boots of leather, rubber, and fabric, and combinations of these materials, and rubbers and overshoes. Kresge Dept. Store Corp., Newark, N. J.

262,238. ARCH-GRACE. Women's shoes of leather, rubber, and fabric, and combinations thereof. Chicago Mail Order Co., Chicago, Ill.

262,331. Shield containing letter "H" between the words "HOOVER CORD." Tires and tubes. Giant Tire & Rubber Co., Findlay, O.

262,356. WINGS. Golf Balls. Arlington Rubber Co., Boston, Mass.

262,358. Representation of a bird above which appear the words: "RED HEAD." Golf Balls. Alward-Anderson-Southard Co., Chicago, Ill.

262,490. LINATEX. India rubber in sheets and slabs. Wilkinson Process Rubber Co., Ltd., Kuala-Lumpur, Federated Malay States.

262,504. KAFSTED. Artificial leather. Stedfast Rubber Co., Mattapan, Mass.

262,527. "KOH-I-NOOR." Erasers. "Koh-I-Noor" Bleistiftfabrik L. & C. Hardtmuth, Dresden, Germany.

Dominion of Canada

47,572. LOTOL. Latex compositions. Naugatuck Chemical Co., Naugatuck, Conn., U. S. A.

47,637. DICTATOR. Heels and soles. Holtite Mfg. Co., Baltimore Md., U. S. A.

47,685. FLEX. Carbon black. Thermatomic Carbon Co., Pittsburgh, Pa., U. S. A.

United Kingdom

501,993. Word: "CONTINENTAL" between two circles, each containing a representation of a prancing horse and the letters: "C. C. & G. P. Co. H." Surgical or curative contrivances of rubber or gutta percha. Continental Caoutchouc & Gutta Percha Co., Hannover, Germany.

502,157. DELA. Overcoats and mackintoshes. Dela Rubber Co., Ltd., Manchester.

504,225 and 504,226. DELASILK. Waterproofed piece goods and articles of clothing wholly or principally of silk. Dela Rubber Co., Ltd., Manchester.

505,317 and 505,318. BULWARK. All goods included in Classes 8 and 40. Redfern's Rubber Works, Ltd., Cheshire.

Designs

United States

79,528. TIRE. Term 3½ years. B. Omoto, Green River, Wyo.

79,583. COMBINED SOLE AND HEEL. Term 7 years. D. A. Cutler, Wollaston, assignor to Alfred Hale Rubber Co., Atlantic, both in Mass.

79,685 and 79,686. TIRE. Term 14 years. H. C. Hower, Chicago, Ill.

Dominion of Canada

8,518, 8,520, and 8,526. TIRES. Dominion Rubber Co., Ltd., Montreal, P. Q.

MARKET REVIEWS

Crude Rubber

New York Exchange

CRUDE rubber futures declined 3 cents in the four weeks from October 26 to November 22. December sold at 19.20 cents on October 26 and closed at 16.00 cents on November 22, after selling below 16 cents the previous week. January dropped from 19.40 to close at 16.30, after touching 16.00, within the same period. The two major influences that contributed to the decline were the developments in the securities market and the excessive supply of Malayan rubber.

As to the latter the Department of Commerce advices stated: "Production of Malayan rubber for 1929 is now estimated at between 420,000 and 440,000 tons, against previous estimates of only 300,000 to 350,000 tons. This unexpectedly big output, a new high over previous figures of slightly less than 300,0000 tons produced during the restricted period of 1922-28, is reported as the dominating factor in the world rubber situation.

"The most satisfactory explanation of Malayan 1929 production is that the acreage figures in general, and for native rubber in particular, have always been underestimated by British authorities, and that the per acre yield for native rubber has also been underestimated. The production per acre figure is increasing on rubber plantations generally each year owing to improved cultivation, use of fertilizers, better tapping methods, and more careful attention to the health of the trees."

RUBBER EXCHANGE ACTIVITIES

Transactions

Week Ended	Contracts Sold: Number	Contracts Sold: Tons	Transferable Notices	Week End Tone
Nov. 2	3,953	9,882.5	0	Steady
Nov. 9	2,916	7,290.0	0	Steady
Nov. 16	4,787	11,967.5	2	Steady
Nov. 23	2,854	7,135.0	2	Steady
Totals	14,510	36,275.0	4	

Each week has brought reports of the increase of rubber stocks in London and Liverpool. On the report of November 16, Henderson gives London stock as 49,302 tons, Liverpool, 16,158 tons; and the Rubber Manufacturers Association reports the October arrivals of crude rubber in the United States as 43,725 tons.

Other developments of unfavorable influence on the price of rubber have been the reduced operations at automobile factories and the curtailment in tire production. The Department of Commerce official figures for the production of automobiles in September are 415,332 compared to 498,361 in August. Production of all types of tires in September totaled 4,794,536 compared to 5,648,623 in August and 6,858,408 in September, 1928. While inventories on September 30 amounted to 13,022,651 against 9,965,527 on September 30, 1928.

During the week ended November 2 the price of crude rubber dropped about a cent a pound in all positions. Dominant influences to the decline were the unfavorable developments in the securities market and the increase of rubber received and afloat from the East. Trading on the Exchange was active with an average daily turnover of 1,700 tons. The price of all positions declined during the week, and the closing prices were about at the low. Prices for the week of October 28 to November 2 were:

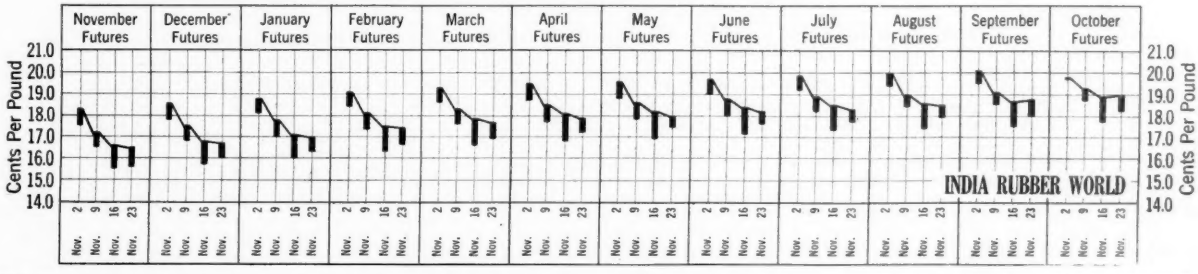
Position	High	Low	Close Nov. 2	Previous Week's Close
Nov.	18.70	17.50	17.50	18.80
Dec.	19.10	17.80	17.80	19.20
Jan.	19.40	18.00	18.10	19.40
Mar.	19.80	18.50	18.60	19.80
May	20.20	18.80	18.80	20.20
July	20.60	19.10	19.20	20.60
Sept.	20.70	19.50	19.50	....

Sales for the week amounted to 9,942½ tons.

Commenting on conditions in the rubber market for the week ended November 9, Lamborn Hutchings & Co. says, "Sentiment in the trade, for the most part, is anything but optimistic, at least as concerns the immediate future. Shipments from the East are still heavy, and are expected to continue so for the next month or two. Stocks in London continue to mount; while the outlook for increased consumption in view of curtailed automobile production is not encouraging."

With a holiday out the market was slightly less active than during the preceding week. The average daily turnover was 1,450 tons. The stock market appeared to be the factor of most influence towards the further decline in prices.

New York Rubber Exchange Clearing House Prices—High and Low Weekly Changes on "A" Contracts for Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—"A" CONTRACTS

Positions 1929	October, 1929: 28	29	30	31	November, 1929: 1	2	4	5*	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23
October ..	17.8	17.7	17.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
November .	18.2	18.1	18.3	18.3	17.5	17.7	17.2	....	16.7	16.8	16.5	16.5	16.0	15.7	15.5	16.3	16.6	16.2	16.5	16.5	16.1	15.8	15.8	15.6
December .	18.5	18.4	18.6	18.6	17.8	18.0	17.5	....	17.0	17.1	16.8	16.8	16.3	15.9	15.7	16.5	16.8	16.5	16.7	16.7	16.3	16.0	16.0	16.0
1930																								
January ..	18.8	18.6	18.8	18.8	18.1	18.3	17.8	....	17.2	17.3	17.0	17.0	16.5	16.1	16.0	16.8	17.1	16.9	17.0	17.0	16.6	16.3	16.3	16.3
February .	19.0	18.9	19.1	19.1	18.4	18.5	18.1	....	17.5	17.6	17.3	17.3	16.8	16.4	16.3	17.1	17.5	17.2	17.3	17.4	16.9	16.6	16.7	16.7
March ...	19.2	19.1	19.3	19.3	18.6	18.7	18.3	....	17.8	17.7	17.6	17.6	17.1	16.8	16.6	17.5	17.9	17.5	17.7	17.7	17.3	16.9	17.0	17.1
April	19.4	19.3	19.5	19.5	18.7	18.9	18.5	....	18.0	18.1	17.8	17.7	17.3	17.0	16.8	17.6	18.1	17.7	17.9	17.9	17.5	17.2	17.3	17.4
May	19.6	19.5	19.6	19.6	18.8	19.0	18.6	....	18.2	18.2	17.9	17.8	17.4	17.1	16.9	17.7	18.2	17.8	18.0	18.0	17.7	17 4	17.5	17.5
June	19.7	19.6	19.7	19.7	19.0	19.2	18.8	....	18.4	18.4	18.1	18.0	17.6	17.5	17.1	17.9	18.4	18.0	18.2	18.2	17.9	17.6	17.7	17.8
July	19.9	19.7	19.9	19.7	19.2	19.3	18.9	....	18.5	18.5	18.2	18.2	17.8	17.5	17.3	18.1	18.5	18.2	18.3	18.3	18.1	17.7	17.8	17.9
August ...	20.0	19.9	20.0	19.9	19.4	19.5	19.0	....	18.6	18.6	18.4	18.4	17.9	17.6	17.4	18.2	18.6	18.3	18.5	18.5	18.3	17.9	18.1	18.1
September	20.1	20.0	20.1	20.0	19.5	19.6	19.1	....	18.6	18.7	18.5	18.5	18.0	17.7	17.5	18.3	18.7	18.4	18.6	18.8	18.4	18.0	18.2	18.2
October ..	....	....	....	....	19.7	19.8	19.3	....	18.8	18.9	18.7	18.7	18.0	17.9	17.7	18.5	18.9	18.6	18.8	19.0	18.6	18.2	18.3	18.4

*Holiday.

The Journal of Commerce on November 12 declares, "A circumstance of particular significance to the trade was the action of the American pool interest in coming out as a seller on the Exchange yesterday. In fact the December sale which set a new low record for the Exchange in the final trading was executed for the account of the pool, which was organized during the British restriction period for the purpose of stabilizing rubber values."

Sales totaled 7,299½ tons. Prices for the week of November 4 to 9 were:

Position	High	Low	Close	Previous Week's Close
Nov.	17.70	16.50	16.50	17.50
Dec.	18.00	16.60	16.80	17.80
Jan.	18.30	16.80	17.00	18.10
Mar.	18.70	17.40	17.60	18.60
May	18.90	17.80	17.90	18.80
July	19.20	18.00	18.20	19.20
Sept.	19.50	18.40	18.50	19.50

Again the week brought losses of a cent a pound in all positions. The Exchange calls attention to the drop in the December position, "When the December delivery in crude rubber Thursday, touched a price of 16.70 cents, it completed a decline of 10 cents a pound from the year's high of 26.70 touched on February 25, equivalent to a loss of $224 per long ton. Applied to the estimated world production of around 800,000 tons, the depreciation in the commodity amounts to $179,000,000. The loss in the value of crude rubber on hand, in transit, overland, and afloat to United States ports, at the end of September is placed at $29,980,608, if compared to the year's best price, and applied to the 133,842 tons reported for that month by the Rubber Manufacturers Association, to be in transit and in stock."

The first three days of the week ended November 16, showed a continued decline, and new low prices were established. November and December sold below 16 cents.

A special sheet from the Exchange reads, "By selling down to 15.70 cents for the December contract, a new low record was established on the Exchange here today [November 13]. The previous low record for the nearby delivery on the Exchange was 16.50 cents made in April, 1928. Yesterday's low was 60 points below the previous one, as well as 50 points below the record low of Monday. Yesterday's decline in crude rubber was due chiefly to the liquidation of further long accounts in the financial district, as well as unfavorable news from the tire and automobile industry. Statistics were hardly more unfavorable to the commodity. London interests now estimate world production of rubber for 1929 at a total of 860,000 tons, and world consumption at 810,000 tons, throwing a surplus of 50,000 tons into stocks at the start of 1930."

During the latter days of the week sharp recoveries in securities and unconfirmed rumors in the trade of a voluntary restriction of tapping to five days a week by some Eastern producers created some favorable sentiment, and in a rising market shorts covered and prices gained over a cent a pound from the week's lows. At the close of the week prices reacted, however, when scattered, and trade selling failed to encounter aggressive buying.

A London cable as reported by the Exchange states that the committee appointed by the British Rubber Growers Association to inquire into the possibilities of a co-operative selling plan for crude rubber, delivered its report, which recommends that leading producing groups be approached with a view to obtaining an agreement for the collective selling of plantation rubber outputs.

The market was active with an average turnover of 1,940 tons. Sales were 11,967½ tons. Prices for the week of November 11 to 16 were:

Position	High	Low	Close	Previous Week's Close
Nov.	16.60	15.50	16.60	16.50
Dec.	16.80	15.70	16.80	16.80
Jan.	17.20	16.00	17.10	17.60
Mar.	17.90	16.60	17.90	16.60
May	18.20	16.90	18.20	17.90
July	18.50	17.30	18.50	18.20
Sept.	18.50	17.50	18.70	18.50

During the week ended November 23 trading was less active, the daily average turnover for the five days being only 1,140 tons. Prices showed gains of more than ½-cent in all positions.

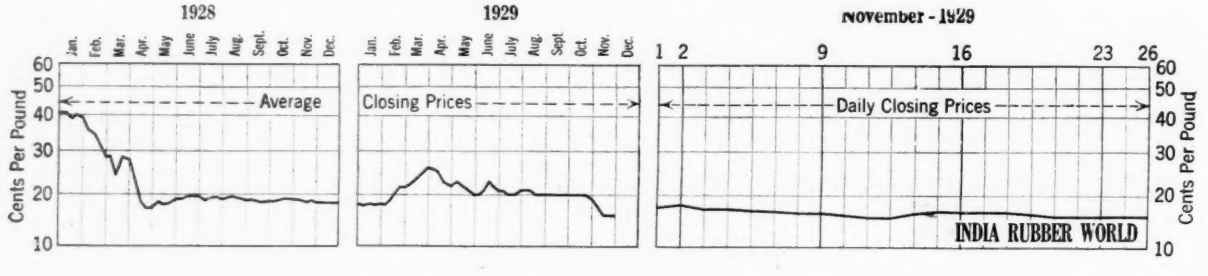
F. R. Henderson, president of the Rubber Exchange, declared, "That while the recommendations of the Rubber Growers' Association of London, for group selling of rubber, might be theoretically practical, there was an almost insurmountable obstacle to their being carried out. Rubber prices eventually will find their true economic level without any artificial aid."

Sales were 6,402½ tons. Prices for November 18 to 23 were:

Position	High	Low	Close	Previous Week's Close
Nov.	15.60	15.60	15.80	16.50
Dec.	17.00	16.00	16.00	16.80
Jan.	17.20	16.30	16.30	17.10
Mar.	17.90	17.00	17.00	17.90
May	18.20	17.40	17.50	18.20
July	18.60	17.80	17.80	18.50
Sept.	18.90	18.00	18.20	18.70

In commenting on conditions in the Exchange market Lamborn Hutchings & Co. states, "With the change in developments has come a change in sentiment, for whereas a week ago there was much talk of 15-cent rubber, the general feeling is that while the late advances may be only temporary, prices have probably seen bottom and that any recession from the present ones would not prevail very long. Quite true, consumption outlook for the

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

Plantations	October, 1929 28	29	30	31	November, 1929 1	2	4	5*	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23
Sheet																								
Ribbed smoked	18⅜	18¼	18⅝	18⅝	17¾	18⅛	17½	....	17⅛	17	16⅝	16¾	16¼	15⅞	15¾	16½	17	16¾	16¾	16¾	16½	16	16	16⅛
Crepe																								
First latex	19¼	19¼	19½	19⅜	18¾	19⅛	18¾	....	18	17⅞	17⅝	17⅝	17	16⅝	16½	17¼	17⅞	17⅝	17⅝	17¾	17¼	16⅞	16⅞	16⅞
"B" blanket	15⅝	15¾	15⅜	15⅝	15	18½	14¾	....	14½	14½	14⅜	14¼	13⅝	13⅜	13⅜	13¾	14⅜	14⅛	14	14¼	13⅞	13½	13½	13½
"C" blanket	15⅛	15⅛	15½	15⅛	14¾	15¼	14½	....	14¼	14¼	14	13⅞	13⅜	13	13	13½	14⅛	13⅞	13¾	14	13⅝	13¼	13¼	13¼
"D" blanket	14⅝	14⅝	15	14⅞	14¼	15⅝	14	....	13¾	13¾	13½	13½	13	12½	12½	13	13⅝	13⅜	13½	13½	13⅛	12¾	12¾	12⅝
No. 2 brown	15⅜	15¼	15⅜	15¼	14¾	15¾	14½	....	14½	14½	14	13¾	13⅜	13	13	13½	14¼	13⅞	13¾	13¾	13¾	13¼	13¼	13¼
Rolled brown	11⅜	11⅜	11½	11½	10¾	14⅞	10¾	....	10½	10½	10¼	10½	10	9⅞	9⅝	10½	10⅜	10⅜	10½	10½	10⅜	9⅞	10	10
Off latex	18⅝	18⅝	18¾	18⅞	18⅛	11¼	17⅞	....	17½	17⅜	17⅛	17¼	16⅝	16⅛	16⅛	16⅞	17⅜	17⅛	17¼	17⅜	16¾	16⅜	16⅜	16⅜

*Holiday.

near future does not seem very bright, but this, along with the recent heavy shipments from the East, increase in stocks, etc., has probably been fully discounted by the decline."

The market on November 25 closed steady with December standard ribs at 16 to 16.1 cents. Transactions totaled 410 contracts, equivalent to 1,025 tons.

At London the market closed dull, unchanged to 1/16 pence decline from Saturday's close, and at Singapore No. 3 Amber spot remained unchanged while the future positions advanced 1/8 pence above the previous close.

New York Outside Market

The market for actuals in November lacked active buying interest on the part of manufacturers. In that respect conditions have remained unchanged for several months. Factory stocks have been maintained on a conservative working basis to meet current needs with a reasonable margin of safety.

The price of standard ribs on October 26 was 18 7/8 cents. From that date the price declined quite steadily to the 15 3/4-cent level reached on November 13. This was succeeded by a rise to 17 cents on the 15th and a new decline to 16 cents on the 21st, closing on November 23 at 16 1/8 cents.

The October collapse of security values in the New York stock market had a depressing effect on rubber. On October 28 rubber prices broke 50 to 60 points in sympathy with the stock market decline. Another influential factor tending to lower the price is the increasing tonnage of domestic and foreign stocks. These total approximately 270,000 tons; while consumption is moderate. A point of interest in connection with stocks is the fact that on November 18 a London dispatch stated that the Rubber Growers' Association adopted on that day the report of the cooperative selling plan committee designed to put into effect a cooperative sales organization among British growers independently of the Dutch growers' program. Later advices indicate that no central sales plan has yet been approved.

In the week ended November 2 rubber manufacturers were buying on the decline. Expectation of further reductions induced caution on the part of consumers in Akron and other rubber manufacturing centers. April-May-June arrivals were being offered then at 19 cents. Latex, clean thin brown and roll brown receded 5/8 to 3/4-cent and ambers slumped a full cent. At the week-end close ribs were 18 1/8 cents down 7/8 from the close of the previous week.

Spot	Nov. 2	Month Ago	Year Ago
Crepe	19 1/8	20 3/8	19 3/8
Ribs	18 1/4	19 3/8	18 5/8
Upriver fine	19 1/4	19 3/4	20

Interest in the market that ended November 9 improved slightly over that of the previous week. There was a fair amount of factory buying early in the week, and latex continued to command a premium of one cent over ribs. On Wednesday standard grades fell 3/8-cent to a basis of 17 1/4 cents for November ribs. The tone was steady, and manufacturers were cautious in buying. November 8 sentiment in the outside market improved in sympathy with the recovery in the Exchange market. All grades of plantation were unchanged. Factory inquiry was fair at the lows, but ceased when prices worked higher. The week-end market for ribs closed at 16 3/4 cents, 1 3/8 cents down from the close of the previous week.

Spot	Nov. 9	Month Ago	Year Ago
Crepe	17 3/8	21 1/8	19 1/2
Ribs	16 3/4	20 1/2	18 1/2
Upriver fine	17 1/4	20 1/2	19 3/4

The market of the week terminated November 16 declined for the first half week reaching on Wednesday the low of 15 3/4 cents for ribs. A rally of 1/2 cent both on Thursday and Friday brought the price for ribs on the latter day to 17 cents. The advance had no disturbing effect on manufacturers owing to the large stocks of rubber available and their present moderate needs. The week closed at 16 3/4 cents for ribs, which was the level of the previous week's close.

New York Quotations

Following are the New York outside market rubber quotations for one year ago, one month ago, and November 26, the current date

Plantation Hevea	November 26, 1928	October 26, 1929	November 26, 1929
Rubber latex (Hevea)...gal.	$1.40 @	$1.45 @	$1.40 @
CREPE			
First latex, spot	.19 @.19 1/8	.19 5/8 @.20	.17 @
November	.19 @.19 1/8	.20 @	.17 @
November-December	.19 @.19 1/4	.20 1/4 @	.17 1/4 @
January-March	.19 1/4 @	.20 3/4 @	.17 1/2 @.18
April-June	.19 5/8 @.19 3/4	.21 1/4 @	.18 1/2 @.18 3/4
Off latex, spot	.18 3/4 @	.19 1/2 @	.16 1/2 @.16 3/4
"B" Blanket, spot	.17 @	.16 1/2 @	.14 1/4 @.14 1/2
November	.17 @	.16 1/2 @	.14 1/2 @.14 1/2
November-December	.17 @	.16 1/2 @	.14 1/2 @.14 3/4
January-March	.17 1/4 @	.17 @	.14 1/2 @.15
April-June	.17 1/4 @.17 1/2	.17 1/2 @	.15 @.15 1/2
"C" Blanket, spot	.16 1/4 @	.16 @	.13 3/4 @.14
Brown No. 1	.17 @	.16 1/4 @	.14 1/4 @.14 1/2
Brown No. 2	.16 1/4 @	.16 @	.13 3/4 @.14
Brown, roll	.14 @.14 1/2	.11 1/2 @	.10 3/4 @.10 1/2
Sheet			
Ribbed, smoked spot	.18 @	.19 @	.16 @.16 1/4
November	.18 @	.19 @	.16 1/4 @
November-December	.18 @	.19 1/4 @	.16 1/4 @
January-March	.18 1/4 @	.19 3/4 @	.17 @.17 1/2
April-June	.18 3/8 @	.20 1/4 @	.17 1/2 @.17 3/4
East Indian			
PONTIANAK			
Banjermasin	.11 @	.10 @	.06 @.08
Pressed block	.20 1/2 @	.14 @.15	.13 @.14
Sarawak	@	.10 @	.09 @
South American			
PARAS			
Upriver, fine	.20 1/2 @	.19 @	.16 @
Upriver, fine	*.24 1/2 @	*.25 @	*.23 1/2 @
Upriver, coarse	.14 @	.09 3/4 @	.08 1/4 @
Upriver, coarse	*.20 1/2 @	*.16 @	*.15 @
Islands, fine	@	.17 1/2 @	.14 3/4 @
Islands, fine	*.24 @	*.24 1/2 @	*.23 @
Acre, Bolivian, fine	.21 @	.19 @	.16 1/2 @
Acre, Bolivian, fine	*.25 @	*.25 1/4 @	*.24 @
Beni, Bolivian	.22 @	.19 1/4 @	.16 3/4 @
Madeira, fine	.21 @	.18 1/2 @	.16 @

South American	November 26, 1928	October 26, 1929	November 26, 1929
PARAS—*Continued*			
Peruvian, fine	$0.20 1/4 @	$0.17 1/2 @	$0.15 @
Tapajos, fine	.20 @	.17 1/2 @	.15 @
CAUCHO			
Upper caucho ball	.13 @	.09 3/4 @	.08 1/4 @
Upper caucho ball	*.20 1/2 @	*.16 @	*.15 @
Lower caucho ball	.12 1/2 @	.09 @	.07 1/4 @
Maniçobas			
Ceará negro heads	†.17 @	†.20 @	†.20 @
Ceará scrap	†.09 @	†.12 @	†.12 @
Manicoba, 30% guaranteed	†.19 @	†.22 @	†.22 @
Mangabiera, thin sheet	†.19 @	†.22 @	†.22 @
Centrals			
Central scrap	.13 @	.08 @.10	.07 @.08
Central wet sheet	.10 @	@	@
Corintó scrap	.13 @	.08 @.10	.07 @.08
Esmeralda sausage	.13 @	.08 @.10	.07 @.08
Guayule			
Duro, washed and dried	.17 1/2 @	.18 @	.17 @
Ampar	.18 1/2 @	.19 1/2 @	.18 @
Gutta Percha			
Gutta Siak	.25 @	.18 @.19	.17 1/2 @.18 1/2
Gutta Soh	.37 @	@	.28 @
Red Macassar	2.90 @	†2.60 @	2.50 @
Balata			
Block Ciudad Bolivar	.50 @	.45 @.46	.40 @.42
Colombia	.47 1/2 @	†.46 @	.38 @.40
Manaos block	.56 @	†.56 1/2 @	†.50 @
Panama	.47 1/2 @	@	.37 @.39
Surinam sheet	.50 1/4 @	.52 @.53 1/2	.51 @.53
Amber	.53 @	.55 @.57	.53 @.55
Chicle			
Honduras	‡.68 @	‡.60 @	‡.68 @
Yucatan, fine	‡.68 @	‡.60 @	‡.68 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal. ‡Duty paid

Spot	Nov. 16	Month Ago	Year Ago
Crepe	17⅝	21	18⅞
Ribs	16¾	20	17¾
Upriver fine	17	20½	19¼

During the week ended November 23 spot ribs held at 16¾ cents for the first two days, fell to 16½ on Wednesday and again declined sharply to 16 cents on Thursday and Friday, rallying to 16⅛ cents at the close on Saturday. Other grades also declined from ⅛ to ¼-cent, except roll brown. Buying interest was at low ebb and the market at a standstill.

Spot	Nov. 23	Month Ago	Year Ago
Crepe	16⅞	20	19
Ribs	16⅛	19⅛	18
Upriver fine	16¾	20	19½

November 25 standard ribs were unchanged on the offering of 16½ cents for November and 16¾ cents for December. The remainder of the list also was unchanged from the previous week. Factory interest appeared to be wholly absent, and the market is in the hands of speculators.

Importations of all grades in October were 43,725 tons compared to 42,515 tons one year ago. Plantation arrivals for October were 42,697 tons, compared to 41,571 tons one year ago. Total importations of plantation rubber for ten months ended October 31 were 466,471 tons compared to 349,934 tons for the corresponding period of 1928. Total importations of all grades of rubber for the ten months ended October 31 were 477,292 tons compared to 364,861 tons for the corresponding period of 1928.

Rubber Afloat to the United States

All figures in long tons

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Nov. 2..	7,776	960	2,012	51	10,799
Nov. 9..	7,103	648	1,470	106	9,327
Nov. 16..	5,584	571	1,960	52	8,167
Nov. 23..	6,109	919	1,711	78	8,817

Industry and Trade

Report of the National Industrial Conference Board

DISCUSSION of the business situation today is dominated by steps taken by the President of the United States to promote activity and by events in the stock market. A review of conditions in productive enterprise can take notice of these happenings only as they operate to increase or decrease industrial and commercial activity. Coming as it did late in October, the preliminary stock market collapse could not affect in any appreciable degree the record for the month as a whole in industry or indeed even in the stock market itself. October records, totals, and averages therefore reflect, in the main, conditions which preceded the break in the stock market.

Automobiles

Automobile and truck production during October reached a total of 394,465, or 5 per cent under October last year and 8 per cent below September this year. Output in the first ten months of this year totaled 5,265,789. During the balance of the year a greater than normal decline in production is looked for, but exports and domestic sales are expected to show a relatively smaller decline, about equal to the corresponding period in 1926. New car and truck registrations during September were 14 per cent larger than September last year. The first nine months' registrations of 3,689,506 were 4 per cent greater than the new registrations for the twelve months of 1928. Foreign sales in September were 3.3 per cent larger than a year ago. The first nine months' sales abroad were 4.3 per cent larger than in the full record year of 1928.

Crude Rubber

October consumption of crude rubber in the United States was 0.3 per cent greater than in September. Total consumption for the first ten months of this year increased 12.3 per cent over the consumption during the first ten months of 1928. Total domestic stock of crude rubber on hand and in transit overland on October 31 was 4.9 per cent greater than on September 30. Crude rubber afloat for United States ports on October 31 was about 0.7 per cent greater than on September 30. Imports of crude rubber into the United States during the month of October increased 34.5 per cent over September and 2.8 per cent over October, 1928. For the ten months ending October 31 total imports of crude rubber were approximately 30.8 per cent greater than in the corresponding period of last year.

Chemicals

Business in chemicals, oils, and drugs was a bit slow, but generally satisfactory during October. Demand in most lines was beginning to reflect the customary tendency of industrial consumers to reduce inventories of supplies as the year-end approaches. This was matched, in most instances, by a slowing up of production, as producers have come to regard their margin of profit more highly than mere volume. Renewal of contracts to cover next year's requirements proceeded at a steady rate during the month. For the most part, contract prices were not changed from prevailing levels. An upward trend has since been noticeable in several chemicals that are of very large consumption.

Cotton

Consumption of raw cotton, exclusive of linters, in October was greater than for any corresponding month since 1923. For the new season, 1929-30, the consumption of 1,745,000 bales has been exceeded only once, 1926-27, since the 1922-23 season. The increase in consumption in October over September was 17.4 per cent and over October a year ago 4.0 per cent. Cotton on hand in consuming establishments on October 31 was 55.6 per cent greater than on the same date last year; while that in public storage and at compresses was 13.5 per cent greater than on the corresponding date a year ago.

Gasoline

On September 30 gasoline stocks were the lowest they have reached this year, the high point being on March 31. August showed the highest single month's consumption of gasoline, not only in this year but in the entire history of the oil business. For the first nine months of this year gasoline consumption showed an increase of 15.1 per cent over the same period of 1928.

Merchandise Sales

A number of agencies indicating demand show for trading in general a level in September and October close to that of the same months of last year. The index of distribution to consumer for September, compiled by the Federal Reserve Bank of New York, while showing an increase over August, was less than in September a year ago. Wholesale sales in September, covering eight lines of trade, increased 0.9 per cent over August, increased sales of meats, hardware, and furniture being sufficient to overcome decreased sales of dry goods, men's clothing, and boots and shoes. Compared with September a year ago, wholesale sales were 2.7 per cent greater. Retail trade of 483 department stores in October increased 3.0 per cent over the same month last year although there was considerable variation in the geographical distribution. Retail demand in October, insofar as reflected by the sales of chain stores, was at a higher level than a year ago, 48 chains reporting an increase of 20.0 per cent over October last year and a gain of 23.5 per cent in the first ten months of the present year as compared with the same period a year ago.

Exports

The approximate total value of exports in October increased 21.1 per cent over September but decreased 3.6 per cent from the amount reported in October a year ago. Total merchandise exports as well as exports of gold last month reached the highest figure recorded since November last year. The value of imports last month, increasing about 11.6 per cent over September and 10.3 per cent over October, 1928, was the largest since last May. During the first ten months of this year the total value of exports was 6.1 per cent greater and imports 8.7 per cent greater than they were in the same period a year ago.

For the nine months ending with September, finished manufactures accounted for 52.0 per cent of the total export, and crude materials, the next largest item, for 18.5 per cent. In September, crude materials constituted 26.0 per cent of the total, compared with 13.5 per cent in August and 29.0 per cent in September a year ago. On the other hand, finished manufactures composed 44.2 per cent in comparison with 53.8 per cent in August and 39.9 per cent in September a year ago. Thsee various changes are seasonal and usually expected to occur.

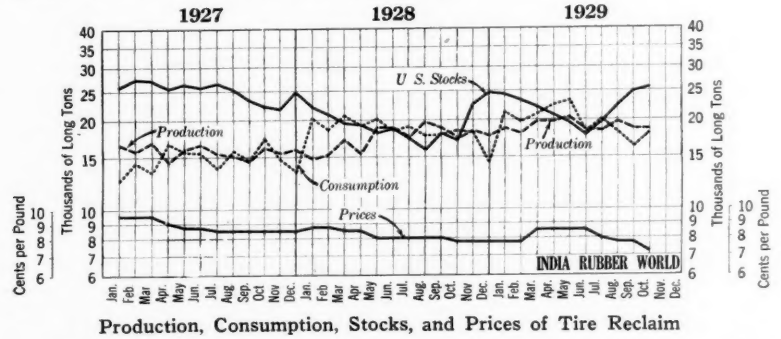
Reclaimed Rubber

RECLAIMING plants were operated the past month for a seasonally reduced output to meet the conservative, steady demand of consumers. Reclaimers anticipate operating on substantially the same basis during December and expect to make the customary increase in output with the opening of the new year.

The consumption of reclaim in July was 20,236 tons. The ratio of reclaim to crude used that month was 48.7 per cent. Notwithstanding that the consumption of reclaim in October was 18,024 tons or 2,212 tons less than in July, the ratio of reclaim to crude consumed rose to 51.8 per cent in October. This relative increase in the use of reclaim is noteworthy because it counteracts the commonly prevalent idea that a drop in crude rubber to such low levels as have prevailed since last spring tend to restrict the use of reclaim. As a matter of fact that is not the case, at least in the practice of the best organized and managed rubber manufacturing plants.

Elimination of reclaim from compounds in favor of low priced rubber was fully demonstrated some years ago to be a serious technical mistake. Such substitution is not now taking place although rubber is at the 16-cent level. The current reduction in reclaim consumption is actually seasonal and further influenced by the exceptional general hesitancy in American industry due to the recent profound deflation of security values, which reacted severely on business of every sort.

Manufacturers in general are naturally cautious under existing circumstances. There are no indications of distress in any of the rubber companies and optimism is uppermost in every line of the rubber trade.



Production, Consumption, Stocks, and Prices of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1927					
January	16,526	12,374	39.3	25,903	726
February	15,860	14,424	47.8	27,291	671
March	16,788	13,528	37.4	27,124	785
April	14,483	16,677	46.5	25,712	899
May	16,159	15,754	46.1	26,419	934
June	16,652	15,547	46.0	25,811	683
July	15,488	13,842	47.4	26,599	674
August	15,109	15,836	47.3	25,157	629
September	14,392	14,790	54.3	23,429	538
October	16,127	17,292	64.5	22,176	571
November	15,477	14,876	55.5	21,728	700
December	16,083	13,431	52.7	24,980	730
1928					
January	14,862	20,140	58.5	21,941	887
February	15,291	18,670	55.4	20,848	813
March	17,069	20,680	57.9	19,558	879
April	15,393	19,280	58.8	19,283	810
May	18,945	20,215	54.1	18,137	889
June	18,781	18,140	48.2	18,709	350
July	17,278	19,070	51.0	17,305	986
August	19,049	17,890	41.7	15,881	909
September	18,693	17,795	44 6	17,991	809
October	17,182	18,420	45.1	17,026	842
November	18,245	18,380	49.1	22,399	730
December	17,728	14,320	45.9	24,785	673
1929					
January	18,685	21,068	49.1	24,394	941
February	18,094	19,829	47.7	23,305	1,028
March	19,984	20,867	46.7	22,076	1,344
April	19,899	22,435	47.3	20,680	1,498
May	20,385	23,176	47.1	19,479	1,299
June	18,416	18,141	42.0	17,980	961
July	18,387	20,236	48.7	19,679	1,202
August	19,787	18,230	47.6	22,309	860
September	18,660	16,416	47.2	24,984	657
October	18,698	18,024	51.8	25,474	830

*Stocks on hand the last of the month or year.
Compiled by Rubber Manufacturers Association.

New York Quotations

November 26, 1929

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black	1.20	$0.12 @ $0.12½
red	1.20	.11 @ .11½
Auto Tire		
Black	1.21	.07 @ .07¼
Black selected tires	1.18	.07¼ @ .07½
Dark gray	1.35	.09 @ .09½
Light gray	1.38	.10 @ .10½
White	1.40	.11½ @ .12
Shoe		
Unwashed	1.60	.07 @ .07¼
Washed	1.50	.09¾ @ .10
Tube		
No. 1	1.00	.12½ @ .13
No. 2	1.10	.10 @ .10¼
Truck Tire		
Truck tire, heavy gravity	1.55	.07 @ .07¼
Truck tire, light gravity	1.40	.07¼ @ .07½
Miscellaneous		
Red	1.35	.11 @ .11½
Mechanical blends	1.60	.06½ @ .07

October Consumption and Stocks

Consumption of crude rubber of all classes by manufacturers in the United States in October is estimated at 34,800 long tons, according to statistics compiled by The Rubber Manufacturers Association, 250 W. 57th St., New York, N. Y. This compares with an estimated consumption of 34,707 long tons for September. Total consumption of crude rubber by American manufacturers for the first ten months of this year is estimated at 418,614 long tons. Consumption during the first ten months of 1928 was 372,646 long tons.

Consumption of reclaimed rubber is estimated at 18,024 long tons for October and 199,077 long tons for the ten months' period.

These estimates are based on reports received by the association from manufacturers who are estimated to represent 90 per cent of the total consumption in the United States.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on October 31 at 88,483 long tons compared with 84,362 long tons as of September 30. Crude rubber afloat for United States ports on October 31 is estimated at 49,835 long tons as against 49,480 long tons on September 30. These estimates are based on reports to the association which are believed to represent 95 per cent of the total for the United States.

October Rubber Imports

Imports of crude rubber of all classes into the United States during October totaled 43,725 long tons according to estimates issued by The Rubber Manufacturers Association, 250 W. 57th St., New York, N. Y. This compares with imports of 32,515 long tons in September and with 42,515 long tons in October, 1928.

For the ten months ended October 31 total imports of crude rubber are estimated at 477,291 long tons as against imports of 364,861 long tons for the corresponding period of last year.

Rubber Scrap

DURING November the rubber scrap consuming demand on most grades was steady and dull. Prices declined on a few grades in each division except hard rubber. The heaviest decline was on mixed auto tires with beads, beadless, and mixed auto peelings on which the reduction was virtually $2 per ton. Twelve of the standard grades remain unchanged in price. Reclaimers' yards are well stocked with scraps, and buying interest is not very active.

BOOTS AND SHOES. The market is quiet, and demand steady.

HARD RUBBER. Current interest is dull. Price firm and unchanged.

MECHANICALS. This division of the market is generally quiet. The only grade in good demand is air brake, which has declined $1 per ton. Quotations on all other mechanical grades remain unchanged from one month ago.

TIRES. Automobile tire grades are rather dull because of the large stocks in reclaimers' stock yards.

WHITE AUTO TIRES. Tires, beads and beadless, are steady, and the supply is scarce.

SOLID TIRES. The price is steady and unchanged, with a good export demand.

INNER TUBES. Floating inner tubes are quiet and steady. Supply is scarce. No. 2 compounded is unchanged in price. Red tubes are quoted at 4⅜ down ½-cent from one month ago. Mixed tubes have declined to 3¾ cents flat down ⅝-cent.

CONSUMERS' BUYING PRICES

Carload Lots

November 26, 1929

Boots and Shoes

		Prices
Boots and shoes, black	lb.	$1.40 @$1.45
Untrimmed arctics	lb.	.00¾ @ .01
Tennis shoes and soles	lb.	.00¾ @

Inner Tubes

No. 1, floating	lb.	0.07¼ @ 0.07½
No. 2, compounded	lb.	.04⅛ @ .04¼
Red	lb.	.04⅜ @ .04⅝
Mixed tubes	lb.	.03¾ @

Tires

		Prices
Pneumatic Standard—		
Mixed auto tires with beads	ton	21.00 @21.50
Beadless	ton	30.00 @30.50
White auto tires with beads	ton	40.00 @42.00
Beadless	ton	48.00 @49.00
Mixed auto peeling	ton	33.00 @34.00
Solid—		
Mixed motor truck, clean	ton	22.00 @23.00

Mechanicals

Mixed black scrap	lb.	.00½ @ .00⅝
Hose, air brake	ton	23.00 @
regular soft	lb.	.00⅝ @
No. 1 red	lb.	.02 @ .02¼
No. 2 red	lb.	.01 @ .01½
White druggists' sundries	lb.	.02 @ .02½
Mechanical	lb.	.01½ @ .01⅝

Hard Rubber

No. 1 hard rubber	lb.	$0.10 @$0.10½

English Rubber Scrap Market

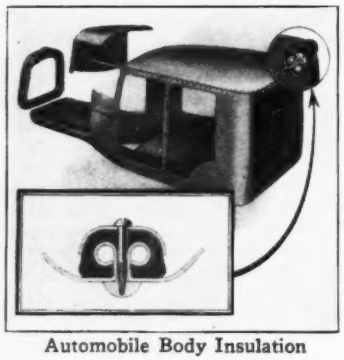
(By Cable)

CONSUMERS' BUYING PRICES

London, November 27, 1929.

	£ per Ton	
Galoshes	£4 @	£5
Prime ebonite	30 @	35
Motor tires	3 @	3½
Floating motor tubes	30 @	35
Red motor tubes	18 @	20

Market reported weak.



Automobile Body Insulation

Automobile Body Shock Insulation

SOME years ago engineers found that properly cured molded rubber, when held under predetermined compression throughout, suitably designed to take the action of motor-car springs both at the pivot end and shackle end, functioned better in every respect than steel shackles. This system of shock insulation has been extended for the elimination at the source of vibration, road shocks, squeaks, rattles, greasing and oiling, broken springs, and bad riding.

One of the latest applications in this line is that adaptable in the insulation of closed automobiles against vibration and drumming. The fundamental idea is that the bodies have edges that are turned, and a rubber molding is snapped into this shaped portion and is pulled into compression by clamping, as pictured in the accompanying illustration. Body panels in this way are held together semi-rigidly and by the resilient action of the rubber will not squeak, rattle, or drum.

AIRCRAFT RUBBER GOODS

Numerous Ingenious Uses of Resilient Fittings Interest Crowds at Western Aeronautical Exhibit

Not the least interesting feature to over 90,000 people who attended the $2,000,000 Western Aircraft Show at Los Angeles, Calif., on November 9 to 17 was the striking display of rubber articles essential to blimps and planes ranging from the tiniest sport models to the giant 194-miles an-hour machine exhibited.

Of especial concern to many were the pneumatic tires that are so important a factor in safe take-offs and landings; and the advantages of the newer types in absorbing more efficiently the severe shock loads when planes touch rough ground at high speed were well set forth by representatives of the Firestone, Goodrich, and Goodyear companies, each concern displaying complete lines of the newest in "doughnut" and standard airplane tires for landing gear and tail support. Besides tires, Goodrich also showed an extensive assortment of rubber accessories.

In a demonstration of refueling it was explained how a 40-foot length of special 1½-inch hose had been used in the "St. Louis Robin" endurance flight of over 400 hours; how an air-inflated rubber mattress over fuel tank and fuselage had afforded the pilots a chance to rest; how the rocker boxes of the engine had been connected with rubber tubes from the dash to the alemite parts, so that the rocker arms could be kept well lubricated; and many other unique applications of rubber.

Accessories that also attracted much attention were light oil and gasoline-resistant rubber pipe lines, which, unlike copper and brass pipes, would be unaffected by the intense vibration of the planes in flight, for feeding fuel from tanks to motors; rubber fitments for snubbing on some types of oil-gear shock absorbers; sponge rubber gasoline tank covers; air-inflated rubber cushions; rubber tail-skid mounting; rubber laminated aeroboard for pontoons and fuselages, samples showing the cellular rubber faced on one or both sides with hard rubber, and with metal, wood, fabric, and wire screen; rubber cements for general utility, for attaching matting or wood to metal, and for attaching rubber to metal; rubber tubing for instruments on dashboards, voice-communicating sets, etc.

Other rubber accessories included landing-gear shock absorber cord; insulated starter, ignition, radio, and lighting wires and cables; tension cord on rubber pedals; sponge rubber cushioning for compass, altimeter, radiotrons, chronometer, radio table, generator, and battery jars; folding life boats; soft, medium, and hard shock-absorber disks; airplane matting; pontoon hand-hole covers; radiator hose; engine-mount pads; control handle grips; grommets; rubberized wool-lined flying suits; sponge rubber face masks; rubber-edged goggles; and helmet ear-pieces.

The Willard Storage Battery Co. had a fine exhibit of hard rubber cell threaded-rubber separator batteries. The Emsco Aircraft Co., Downey, Calif., controlled by E. M. Smith, of the E. M. Smith Rubber Co., Los Angeles, had one of the handsomest touring planes in the show. The Goodyear Tire & Rubber Co. of California exhibited a 10-foot baby blimp; its dirigible "Volunteer" circled the show grounds daily, and on the last day the Goodyear Universal Fokker plane arrived from Akron to pay its respects before starting to visit all the leading cities on the Coast to demonstrate the new "Airwheels."

ADVERTISING PAGES REMOVED

Compounding Ingredients

THE depressing effect of the recent collapse of the stock market was reflected in the slowing up of activity in all lines of trade and industry. Tire and tube production embracing the major part of the rubber manufacturing industry was quick to respond to the curtailment of automobile production and is proceeding on virtually 50 per cent of capacity. Production in mechanical rubber goods is reported fair; the same is generally true in other branches of the industry. In conformity with these conditions the demand for rubber compounding ingredients may be described as generally mildly active or routine for most of the items.

ACCELERATORS. The well-established accelerators that combine in their action, rapid low temperature curing effect and freedom from scorching are growing in favor. They not only improve the physical properties of the rubber but effect economy of production by reducing curing time.

AGE RESISTERS. These products are diversified in chemical effect sufficiently to afford protection against deterioration of rubber goods by oxidation, sunlight, and flexing fatigue. Their demonstrated technical value assures them a permanent place in rubber technology.

BENZOL. The general demand is broad and production is active.

CARBON BLACK. The demand by the rubber industry is fair. Spot price on carload lots was reduced on November 16 to 6 cents f. o. b. Texas works.

CLAY. This universally used reenforcing ingredient is in good demand because of its value and low price.

LITHARGE. Two price reductions took effect before the middle of November, each of ¼-cent a pound, bringing the price for commercial grade in casks to 8¾ cents. The demand is reduced to routine.

LITHOPONE. This is the only ingredient the demand for which is considered brisk. The price is unchanged at 5¼ cents a pound.

M. R. This generally favored material is in steady demand for general molded products, heels, etc., at steady prices.

SOFTENERS. These materials are in great variety to meet differing conditions of processing, quality, and service requirements of goods. Each has its field of usefulness and all are in steady demand.

V. M. P. NAPHTHA. The price is firm and steady, and the demand by the rubber trade is routine.

STEARIC ACID. The price holds firm and unchanged, and demand is steady. It is the acknowledged stabilizer of curing quality for general purposes.

ZINC OXIDE. The price of metallic zinc advanced the past month but not sufficiently to effect a rise in the price for zinc oxide. The rubber industry's demand for this material is dull.

New York Quotations

November 26, 1929

Accelerators, Inorganic

Lead, carbonate	lb.	$0.09	@
Lead, red	lb.	.09¾	@
sublimed white	lb.	.08½	@
sublimed blue	lb.	.08½	@
super-sublimed white lead	lb.	.08¾	@
Lime, R. M. hydrated	ton	20.00	@
Litharge	lb.	.08¾	@
Magnesia, calcined heavy	ton	90.00	@
carbonate	lb.	.08¾	@ .11
Orange mineral A.A.A.	lb.	.11¾	@

Accelerators, Organic

A-7	lb.	.55	@ .65
A-11	lb.	.62	@ .75
A-16	lb.	.57	@ .65
A-19	lb.	.58	@ .75
A-20	lb.	.64	@ .80
A-32	lb.	.80	@ .95
Aldehyde ammonia	lb.	.65	@ .70
Butene	lb.	.78	@ .80
Captax	lb.		@
Crylene	lb.		@
paste	lb.		@
D. B. A.	lb.	2.00	@
D. O. T. G.	lb.	.42	@ .44½
D. P. G.	lb.	.30	@ .32½
Ethylidineaniline	lb.	.45	@ .47½
Formaldehydeaniline	lb.	.37½	@ .42½
Grasselerator 102	lb.		@
552	lb.		@
808	lb.		@
833	lb.		@
Heptene	lb.	.40	@
base	lb.	1.60	@
Hexamethylenetetramine	lb.	.58½	@ .61
Lead oleate, No. 999	lb.	.16	@
Witco	lb.	.14	@
Lithex	lb.	.20	@
Methylenedianiline	lb.		@
Monex	lb.	3.25	@
Phenex	lb.	.70	@ .75
Plastone	lb.		@
R-2	lb.	2.00	@ 2.50
R. & H. 40	lb.	.40	@ .42½
50	lb.	.40	@ .42½
Safex	lb.	1.20	@
S-P-D-X	lb.	.70	@ .75
Tensilac No. 39	lb.	.40	@ .42½
No. 41	lb.		@
Thermlo F	lb.	.50	@ .55
Thiocarbanilid	lb.	.25½	@ .28½
Trimene	lb.	.75	@
base	lb.	1.20	@
Tuads	lb.		@
V. G. B.	lb.	.56	@ .60
Waxene	lb.	.30	@ .40
Z. B. X.	lb.	2.50	@
Z-88	lb.	.50	@ .60
Zimate	lb.		@

Acids

Acetic 28% (bbls.)	100 lbs.	3.88	@ 4.13
glacial (carboys)	100 lbs.	14.18	@ 14.43
Sulphuric, 66°	100 lbs.	.77½	@ .78

Alkalies

Caustic soda, solid	100 lbs.	2.75	@ 3.00

Antioxidants

Age-Rite, powdered	lb.		@
resin	lb.		@
white	lb.		@

Antioxidants (*Continued*)

Albasan	lb.	$0.70	@ $0.75
Antox	lb.		@
Grasselerager A	lb.		@
Resistex	lb.	.54	@ .65
Stabilite-Alba	lb.	.70	@ .75
Sunproof	lb.	.37½	@

Colors

BLACK

Bone	lb.	.09½	@
Carbon (see compounding ingredients)			
Drop (bbls.)	lb.	.05½	@ .15
Lampblack (commercial)	lb.	.07	@ .08

BLUE

Akco blue	lb.		@
Huber brilliant	lb.	4.20	@ 4.70
Prussian	lb.	.35	@ .37
Ultramarine	lb.	.06	@ .30

BROWN

Huber mocha	lb.	1.60	@ 2.10
Sienna, Italian, raw	lb.	.05½	@ .12½

GREEN

Akco green	lb.		@
Chrome, light	lb.	.27	@ .31
medium	lb.	.28	@ .31
Chromium oxide	lb.	.33	@ .38
Huber brilliant	lb.	4.35	@

ORANGE

Huber Persian	lb.	.50	@ 1.00

RED

Akco red	lb.		@
Antimony			
Crimson, 15/17%	lb.		@
Sulphur free	lb.		@
Crimson, R. M. P. No. 3	lb.	.48	@
Sulphur, free	lb.	.52	@
Vermilion, No. 5	lb.		@
No. 15	lb.		@
Golden	lb.		@
No. 60	lb.		@
15/17%	lb.		@
Z-A	lb.	.35	@
Z-2	lb.	.22	@
Aristi	lb.		@
Huber brilliant	lb.	1.35	@ 1.85
Iron Oxides			
bright pure domestic	lb.	.12	@
bright pure English	lb.	.13	@
bright reduced English	lb.	.10	@
bright reduced domestic	lb.	.10	@
Indian (maroon), pure domestic	lb.	.11	@
Indian (maroon), pure English	lb.	.11	@
Indian (maroon) reduced English	lb.	.09½	@
Indian (maroon) reduced domestic	lb.	.11	@
Oximony	lb.	.13¼	@

Colors—(*Continued*)

Spanish red oxide	lb.	$0.03	@ $0.04¼
Sunburnt red	lb.	.14	@
Venetian red	lb.	.02	@ .06

WHITE

Lithopone	lb.	.05½	@ .05¾
Albalith	lb.		@
Azolith	lb.	.05¼	@ .05¾
Grasselli	lb.	.05¼	@ .05¾
Sterling	lb.		@
Vanolith	lb.	.05½	@
Titanox	lb.	.08½	@ .09
Zinc Oxide			
AAA (lead free) (bbls.)	lb.	.07	@
Azo (factory):			
ZZZ (lead free)	lb.	.06½	@ .07
ZZ (leaded)	lb.	.06¼	@ .06¾
Z (8% leaded)	lb.	.06¼	@ .06¾
Green seal	lb.		@
Kadox	lb.		@
Red seal	lb.		@
Special	lb.		@
White seal	lb.		@
XX green label	lb.		@
XX red label	lb.		@

YELLOW

Akco yellow	lb.		@
Cadmium sulphide	lb.	1.00	@ 1.40
Chrome	lb.	.17	@ .17½
Grasselli cadmium	lb.		@
Huber canary	lb.	3.30	@ 3.80
Ochre, domestic	lb.	.01¾	@ .02½
French	lb.	.03	@
Oxide, pure	lb.	.09	@
Zinc, C. P., imported	lb.	.21	@

Compounding Ingredients

Aluminum flake (sacks, c.l.)	ton	21.85	@
(sacks l.c.l.)	ton	24.50	@
Ammonium carb. pwd.	lb.	.11	@
lump	lb.	.10½	@
Asbestine	ton	25.00	@
Barium carbonate	ton	57.00	@ 60.50
Baryta white (f.o.b. St Louis, bbls.)	ton	23.00	@
Baryta white (f.o.b. St. Louis, paper bags)	ton	22.20	@
Barytes, pure white	ton	35.00	@
off color	ton	27.50	@
medium	ton	32.50	@
Foam "A" (f.o.b. St Louis, bbls.)	ton	23.00	@
Foam "A" (f.o.b. St. Louis, bags)	ton	23.00	@
Basofor	lb.	.04½	@
Blanc fixe, dry	lb.	.04½	@
pulp	ton	42.50	@ 45.00
Carbon Black			
Aerfloted arrow	lb.	.07	@
Century	lb.	6.10	@
Compressed	lb.	.06½	@ .12
Disperso	lb.	6.10	@
Fumonex	lb.	.05	@ .09
Gastex (f.o.b. fact'y)			
contracts	lb.	.04½	@ .05¼
carload	lb.	.05½	@
less carload	lb.	.06½	@ .08
Micronex	lb.	.07	@ .12
Uncompressed	lb.	.06½	@ .11
Velvetex	lb.	.04	@ .06

Compounding Ingredients *(Continued)*

Carrara filler	ton		@	
Chalk	ton	$12.00	@	
Clay, Blue Ridge, dark	ton		@	
Blue Ridge, light	ton		@	
China	lb.	.01¼	@	
Dixie	ton		@	
Langford	ton		@	
Mineral flour (Florida)	ton		@	
Perfection	ton	25.00	@	
Suprex	ton	8.00	@	20.00
Tensulite	ton	10.00	@	
Cotton flock, black	lb.	.13	@	
light-colored	lb.	.10	@	.11
white	lb.	.12	@	.30
Glue, high grade	lb.	.25	@	.35
low grade	lb.	.16	@	.23
Infusorial earth	ton	50.00	@	
Mica amber	lb.	.05	@	
Neomerpin, S. A. conc	lb.	.60	@	
Pumice stone, pwd	lb.	.02½	@	.04
Rottenstone, domestic	ton	23.50	@	28.00
Shellac, fine orange	lb.	.60	@	
Soapbark (cut)	lb.	.12	@	.12½
Soapstone	ton	15.00	@	22.00
Talc, domestic	lb.	.01¼	@	
French	ton	18.00	@	22.00
Pyrax A	ton		@	
B	ton		@	
Thermatomic carbon	lb.		@	
Whiting				
Domestic	100 lbs.	1.00	@	
English, cliffstone	100 lbs.	1.50	@	
Imported chalk	100 lbs.	.90	@	1.10
Paris White, English cliffstone	100 lbs.	1.50	@	2.50
Quaker	ton		@	
Slate flour, gray (fact'y)	ton	7.00	@	
Snow white	ton		@	
Sussex	ton		@	
Vancolloid	ton		@	
Vansulite	ton	14.00	@	
Westminster Brand	100 lbs.		@	
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@	

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	lb.	.05	@	
Genasco (fact'y)	ton	50.00	@	52.00
Gilsonite (fact'y)	ton	37.14	@	39.65
Granulated M. R.	ton		@	
Hydrocarbon, hard	ton		@	
Hydrocarbon, soft	ton		@	
Ohmlac Kapak, M. R. (f.o.b. fact'y)	ton	60.00	@	
M. 4 (f.o.b. fact'y)	ton	175.00	@	
Paradura (fact'y)	ton	62.50	@	65.00

New York Quotations

November 25, 1929

Mineral Rubber *(Continued)*

Pioneer, M. R., sol'd fact'y)	ton	$40.00	@	$42.00
M. R. granulated	ton	50.00	@	52.00
Robertson, M. R., solid (fact'y)	ton	34.00	@	80.00
M. R. granulated	ton	38.00	@	80.00
Vansul Puro	ton	24.00	@	

Oils

Kerosene	gal.	.15	@	
Mineral	gal.	.20	@	
Poppy seed oil	gal.	1.35	@	1.70
Rapeseed	gal.	.80	@	
Red oil, distilled	lb.	.10⅝	@	.11¼
Rubber process	gal.	.25	@	
Spindle	gal.	.30	@	

Rubber Substitutes or Factice

Black	lb.	.08	@	.14
Brown	lb.	.08	@	.15
White	lb.	.09	@	.16

Softeners

Burgundy pitch	100 lbs.	5.00	@	6.75
Atlas	100 lbs.	6.75	@	
Corn oil, crude	lb.	.10½	@	
Cottonseed oil	lb.	.11	@	
Cycline oil	gal.	.26	@	.34
Degras	lb.	.03¼	@	.04½
Fluxrite (fluid)	lb.	.05	@	
Moldrite	lb.		@	
Palm oil (Lagos)	lb.	.09	@	
Palm oil (Niger)	lb.	.08¾	@	
Palm oil (Witco)	lb.	.10	@	
Para-flux	gal.	.17	@	
Petrolatum, snow white	lb.	.08⅜	@	.08⅝
Pigmentar	lb.	.02½	@	.03
Pigmentaroil (tank cars, factory)	gal.	.26	@	
(bbls., drums)	gal.	.26	@	
Pine oil, dest dist lled	gal.	.55	@	.58
Pine tar (retort)	bbl.	11.50	@	12.00
Rosin K (bbls.)	280 lbs.	8.77½	@	
Rosin oil compounded	gal.	.30	@	
No. 3, deodorized	gal.	.62½	@	
No. 556, deodorized	gal.	.54½	@	
Rubber seed, drums	lb.	.09½	@	
Rubite	lb.	.10	@	
Rubtack	lb.	.10	@	
Stearex	lb.	.15	@	.20
Stearic acid, double pressed	lb.	.15¾	@	.16¼

Softeners *(Continued)*

Tackol	lb.		@	
Vansulol	lb.	$0.10	@	
Vantar (pine tar)	gal.	.35	@	
Witco No. 20	gal.	.17	@	
Woburn oil	lb.	.05½	@	.06

Solvents

Benzol (90% drums)	gal.	.28	@	
Carbon bisulphide (drums)	lb.	.05½	@	.11
tetrachloride (drums)	lb.	.06½	@	.10
Cyclohexanonemethyl	lb.	.70	@	
Dip-Sol	gal.	.13	@	
Dryolene, No. 9	gal.	.10½	@	
Gasoline				
No. 303				
Drums, c. l.	gal.	.20	@	
Drums, l. c. l.	gal.		@	
Tankcars	gal.	.16	@	
Hexalin	lb.	.60	@	
acetate	lb.	.70	@	
Rub-Sol	gal.	.09	@	
Solvent naphtha	gal.	.35	@	
Stod-Sol	gal.	.10	@	
Turpentine, Venice	lb.	.20	@	
dest distilled	gal.	.40	@	.43

Vulcanizing Ingredients

Sulphur				
Velvet flour (240 lb. bbls.)	100 lbs.		@	
(150 lb. bags)	100 lbs.		@	
Soft rubber (c.l.)	100 lbs.		@	
(l.c.l.)	100 lbs.		@	
Superfine commercial flour (bbls.)	100 lbs.	2.55	@	3.10
(bags)	100 lbs.	2.40	@	2.80
Tire brand, superfine,	100 lbs.	1.90	@	2.25
Tube brand, velvet	100 lbs.	2.40	@	2.75
Sulphur chloride	lb.	.05	@	.07
Vandex (selenium)	lb.		@	
(See also Colors—Antimony)				

Waxes

Beeswax, white, com.	lb.	.50	@	.55
carnauba	lb.	.37	@	.38
ceresine, white	lb.	.10	@	.11
montan	lb.	.06	@	.06½
ozokerite, black	lb.	.21	@	.22
green	lb.	.23	@	.24

Paraffin

122/124 crude, white scale	lb.	.03¼	@	
124/126 crude, white scale	lb.	.03¼	@	
123/125 full refined	lb.	.04¼	@	.04⅞
125/127 fully refined	lb.	.04¼	@	

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	October, 1929 Number	October, 1929 Per Cent	10 Months, 1929 Number	10 Months, 1929 Per Cent
Motorcycle				
24 x 3 "CC"	.....	...	10,464	0.0
24 x 3 Std.	.....	...	4,668	0.0
26 x 3 "CC"	.....	...	1,971	0.0
26 x Std.	2,516	0.2	3,551	0.0
28 x 3 "CC"	.....	...	2,194	0.0
18 x 3 SS	1,886	0.1	24,196	0.1
19 x 3 SS	.....	...	16,531	0.1
Clincher				
30 x 3½	38,764	2.4	300,070	1.3
31 x 4	.....	....	765	0.0
18" Balloon				
18 x 3	33,187	2.0	1,249,884	5.5
18 x 3.25	5,043	0.3	117,424	0.5
18 x 4½	23,000	1.4	287,583	1.3
18 x 5	12,143	0.7	90,711	0.4
19" Balloon				
19 x 2.75	40,282	2.4	474,258	2.9
19 x 3½	8,142	0.5	564,549	2.5
19 x 4	239,043	14.5	4,000,804	17.7
19 x 3.25	48,143	2.9	328,560	1.4
19 x 4½	112,019	6.8	900,125	3.9
19 x 5	29,098	1.8	179,440	0.8
20" Balloon				
20 x 2.75	310,757	18.9	5,253,019	23.2
20 x 3½	1,832	0.1	73,341	0.3
20 x 4	20,263	1.2	1,577,569	6.9
20 x 4½	36,494	2.2	336,797	1.5
20 x 5	947	0.1	231,329	1.0
20 x 6	2,504	0.2	37,625	0.2
20 x 4.00 DC	2,504	0.2	16,055	0.1
21" Balloon				
21 x 2.75	10,718	0.6	143,503	0.6
21 x 2.75 DC	262,934	15.9	1,784,872	7.8
21 x 3½	47,870	2.9	354,745	1.6
21 x 4	4,419	0.3	66,980	0.3
21 x 4½	8,328	0.5	63,245	0.3
21 x 5	602	0.0	6,109	0.0
21 x 6	.....	....	3,668	0.0
22" Balloon				
22 x 3½	.....	....	170	0.0
22 x 4	.....	....	1,469	0.0
22 x 4½	212	0.0	2,145	0.0

Rim Size	October, 1929 Number	October, 1929 Per Cent	10 Months, 1929 Number	10 Months, 1929 Per Cent
High Pressure				
30 x 3½—23	2,588	0.2	32,202	0.1
31 x 4 —23	.....	....	1,086	0.0
32 x 4½ —23	5,877	0.4	49,046	0.2
32 x 4 —24	464	0.0	28,524	0.1
33 x 4½—24	.....	....	98	0.0
32 x 30—25	.....	....	1,056	0.0
34 x 4½—25	.....	....	3,472	0.0
20" Truck				
30 x 5	280,949	17.0	3,178,730	14.0
32 x 6	23,140	1.4	396,682	1.8
34 x 7	14,551	0.9	157,059	0.7
36 x 8	7,742	0.5	117,315	0.5
40 x 10	299	0.0	968	0.0
9-10/20	91	0.0	142	0.0
22" Truck				
36 x 7	408	0.0	3,429	0.0
38 x 8	1,557	0.1	12,439	0.1
24" Truck				
34 x 5	1,322	0.1	6,237	0.0
36 x 6	916	0.1	31,402	0.1
38 x 7	48	0.0	44,094	0.2
40 x 8	5,519	0.3	68,239	0.3
44 x 10	52	0.0	298	0.0
9-10/24	67	0.0	76	0.0
Airplane				
8 x 3	.....	....	1,054	0.0
12 x 3	.....	....	1,669	0.0
14 x 3	.....	....	101	0.0
16 x 3	.....	....	43	0.0
18 x 3	.....	....	581	0.0
16 x 3½	.....	....	3,007	0.0
20 x 3½	.....	....	4,095	0.0
20 x 4	.....	....	1,546	0.0
20 x 5	.....	....	221	0.0
20 x 6	.....	....	904	0.0
20 x 8	185	0.0	613	0.0
24 x 10	129	0.0	347	0.0
18 x 4 Clincher	300	0.0	8,030	0.0
Totals	1,649,854	....	22,665,254	....

ADVERTISING PAGES REMOVED

Cotton and Fabrics

AMERICAN COTTON. The spot price of middling American cotton on November 1 was 18.10 cents compared to 19.15 cents on the first day of the preceding month. During the last week of October the moderate decline in cotton of 20 points was in contrast with the violent reaction of the stock market. The bad weather that prevailed over most of the Cotton Belt interfered with picking and ginning and slowed down the movement of cotton to spot markets.

Another factor that contributed to price stability by holding back cotton from the congested market was the reported increase in deliveries to cooperative marketing associations, in acceptance of the Farm Board's offer of loans averaging 16 cents a pound on cotton held by the cooperatives.

On November 4, the price of spot cotton dropped below 18 cents and on Wednesday, November 6, 60 points more to 17.30, the low price for the week.

H. Hentz & Co. says, "The factors that usually play an important part in the price fluctuations of cotton have been ignored. The market continued to be dominated by the stock market, easing after the opening with stocks generally lower, and rallying sharply when the stock market rallied."

A United States cotton crop of 15,009,000 bales was forecast by the Department of Agriculture in its November 8 report. This report as of November 1 is 94,000 bales or .6 of 1 per cent higher than the forecast of October 1 and 3.7 above the 1928 crop of 14,478,000 bales. Increases in Georgia, Alabama, Tennessee, Louisiana, and Arkansas more than offset decreases in Virginia and the Carolinas. The indicated yield for lint cotton per acre is 154.1 pounds compared to 152.9 pounds during 1928 and 155.8 pounds for the ten-year average. The Census Bureau announced that a total of 10,889,314 running bales had been ginned from the 1929 cotton crop prior to November 1 as compared with 10,162,482 bales for the same period of 1928.

Commenting on the government report, Livingston & Co. says, "On the whole with the ginnings to November 1 rather under expectations, it does not look as if the later information would cause a revision of the figures upward, while they possibly will be scaled down, should weather conditions lead to any abandonment of the cotton in the fields. Perhaps it is fairly safe to base ideas of the supply and demand situation on a crop around 15,000,000 bales, which not long ago was the minimum idea of the world's probable consumption for the season."

Geo. H. McFadden & Bro.: "On the basis of the government estimate, with the allowance for the city crop, the supply for the season is about 19,725,000 bales against a supply of 19,670,000 bales last year. Consumption last year was about 15,200,000 bales, which left a carry-over at the end of the season of about 4,470,000 bales. Allowing a consumption of 15,000,000 bales for the present season, the carry-over to the 1930-31 season would be but about 4,725,000 bales."

At the end of the week bullish Washington and Liverpool news together with reports of bad weather in parts of the Cotton Belt effected a rather sharp recovery in prices to a Saturday's close of 17.75. Another favorable influence toward the price improvement was the Census Bureau's report of an increased October consumption compared to that month a year ago, of over 23,000 bales. This report, however, shows an increase of cotton on hand in consuming establishments and warehouses of 844,598 bales.

New York Quotations

November 26, 1929

Drills

38-inch 2.00-yard	yard	$0.17 @
40-inch 3.47-yard		.10 @
50-inch 1.52-yard		.23 @
52-inch 1.90-yard		.19 @
52-inch 2.20-yard		.16⅝ @
59-inch 1.85-yard		.20 @

Ducks

38-inch 2.00-yard D. F.	yard	.17½ @
40-inch 1.45-yard S. F.		.23¼ @
72-inch 1.05-yard D. F.		.35½ @
72-inch 16.66-ounce		.38½ @
72-inch 17.21-ounce		.39¼ @

MECHANICAL

Hose and belting	pound	.36 @

TENNIS

52-inch 1.35 yard	yard	.25½ @

Hollands

R.T.5—30-inch	yard	.16 @
R.T.7—36-inch		.18 @
R.T.8—40-inch		.20 @
48A—32-inch		.12½ @
48A—40-inch		.15½ @

RED SEAL

36-inch		.15½ @
40-inch		.16½ @
50-inch		.25 @

GOLD SEAL

40-inch, No. 72		.20¼ @
40-inch No. 80		.22 @

Osnaburgs

40-inch 2.35-yard	yard	$0.14¼ @
40-inch 2.48-yard		.13½ @
40-inch 3.00-yard		.11⅛ @
40-inch 10-oz. part waste	lb.	.17¾ @
40-inch 7-oz.	lb.	.12½ @
37-inch 2.42-yard	yard	.13⅞ @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yard	.11 @
Bombazine 60 x 48		.10 @
Plaids 60 x 48		.12½ @
Plaids 48 x 48		.11½ @
Surface prints 64 x 60		.13½ @
Surface prints 60 x 48		.12½ @
Print cloth, 38½-in., 60 x 48		.06¾ @
Print cloth, 38½-in., 64 x 60		.07¼ @

Sheetings, 40-inch

48 x 48, 2.50-yard	yard	.12¼ @	.12½
48 x 48, 2.85-yard		.10⅞ @	.11⅛
64 x 68, 3.15-yard		.10¾ @	.11
56 x 60, 3.60-yard		.09⅝ @	
44 x 48, 3.75-yard		.08⅞ @	.09⅛
44 x 40, 4.25-yard		.07⅞ @	.08⅛

Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.06⅞ @	.07
44 x 40, 6.15-yard		.05⅝ @	.05⅞

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded	pound	$0.46 @

BUILDER 23/11

Peeler, karded	pound	.46 @

BUILDER 10/5

Peeler, karded	pound	.43 @

CORD 23/5/3

Peeler, karded, 1⅛-in.	pound	.46 @

CORD 23/4/3

Peeler, karded	pound	.48 @

CORD 23/3/5

Peeler, karded	pound	.51 @

CORD 15/3/5

Peeler, karded	pound	.44 @

CORD 13/3/3

Peeler, karded	pound	.43 @

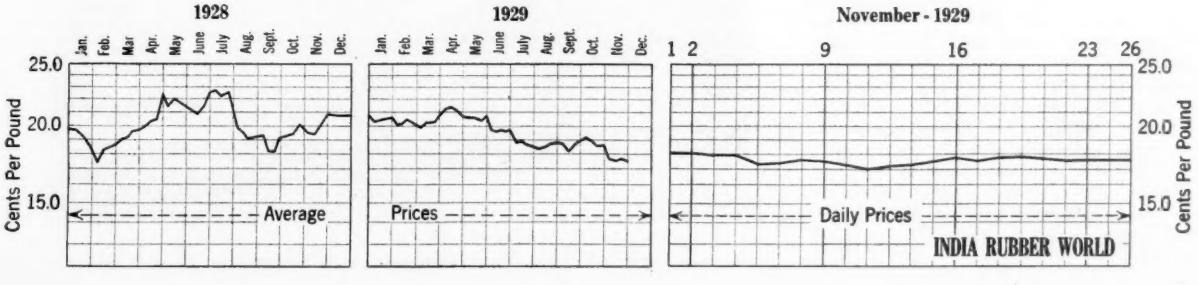
LENO BREAKER

8-oz. Peeler, karded	pound	.46 @
10-oz. Peeler, karded		.46 @

CHAFER

9.5-oz. Peeler, karded	pound	.48 @
12-oz. Peeler, karded		.47 @
14-oz. Peeler, karded		.46 @

New York Cotton Exchange Daily Prices of Spot Middling Upland Cotton



as of October 31, over the amount so held a year ago.

After a setback of ¼-cent on Monday, November 18, cotton advanced again in sympathy with the improved stock market, and in anticipation of light ginning figures from Washington, to 17.80 on Wednesday.

The Census Bureau report placed ginnings prior to November 14 at 11,898,308 bales, compared to 11,320,688 bales up to the same period last year.

Livingston & Co., commenting on the Census Bureau report, says, "These figures represent 79.3 per cent of the crop estimate of 15,009,000 bales and would appear to be about in line with crop ideas of around 15,000,000 bales. It remains for the trade to adjust itself to any idea of the world's consumption that may be developed by the course of events, but it appears to be that some reliance may be placed upon the resistance of the southern spot cotton holders to decline offers below the equivalent of the 16-cent level at concentration points. Moreover, it would seem reasonable to suppose that prices have been forced lower, under the combined influence of the early crop movement and the big break in the stock market, than will be justified by the ultimate relationship of supply and demand."

Weekly Average Spot Prices of Middling Cotton

Oct. 28-Nov. 2	18.16
Nov. 4-9	17.53
Nov. 11-16	17.34
Nov. 18-22	17.66

EGYPTIAN COTTON. During the past month all staple cottons were under the influence of the great decline in the New York stock market and business was slow. The basis, however, held remarkably firm and actually advanced for the better grades of American cottons. There is talk of an oversold condition in certain popular qualities which were very cheap in early October. There is little doubt that a further rise in the basis or an advance in the contract market would bring out cotton now held by the cooperatives and independent farmers.

In Egypt the decline in the market was halted by a government decree authorizing the purchase of Uppers contracts at $19 and of Sakel contracts at $27. The market has recently held steady at figures slightly above these buying prices. Foreign spinners have recently been taking advantage of the present low prices in Egypt and have been good buyers. This fact is now being well borne out by the heavy exports from Alexandria. The quality of this year's Upper Egyptian crop is reported as excellent.

ARIZONA COTTON. In Arizona a prospective crop of about 35,000 bales is moving slowly, owing to the appearance of the pink worm in that section, which has necessitated fumigation of all cotton. Fumigating facilities are being rapidly extended, however, and the crop undoubtedly could be moved out freely after the first of December should spinners decide to buy, but for the time being most buyers seem content to watch the goods market and are not buying cotton of any kind except to cover immediate needs.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market for cotton factory products is quieter following the marked reduction in motor car manufacture. The heavy and sudden deflation of security values in the New York stock market affected all lines, making for caution in the markets tributary to cotton textiles. The approach of the holidays and the annual inventory season combined will probably effect further slowing down of the cotton market. With the turn of the year renewal of orders and of distribution will proceed at a normally reasonable pace. Stocks of cotton textiles are at a minimum in the hands of both jobbers and consumers of cotton goods as raw material of manufacture.

RAINCOAT FABRICS. The fall season of the raincoat trade is practically over and the balance of the business is filling in orders and some last minute orders for the Christmas trade. Fabric manufacturers are now working on new goods and styles for next spring. These will be shown to the trade after the first of next year.

SHEETINGS. There is a decidedly better feeling in the market for sheetings. Steadily improving conditions are expected for business in the immediate future in grey goods.

TIRE FABRICS. Business in tire fabrics during November was particularly dull. Very little was done other than light orders for filling in. Tire manufacturers exhibited no interest in contracting for future deliveries, and trade was thus very unsatisfactory.

The Rubber Manufacturers Association estimates the consumption in September of tire fabrics by 75 per cent of the industry at 18,198,733 pounds.

Southwest Pima Cotton Prospects

Increased mechanization of many of the large cotton plantations of the Southwest and favorable growing conditions will, according to good authority, lead to a marked increase next year in the quantity of cotton to be obtained from that section. The good prices being obtained for Pima this year will, it is said, result in a considerable extension of the acreage planted to that grade. At Litchfield, Ariz., in the Salt River Valley, where extensive plantings of Pima were started a dozen years ago by a Goodyear company subsidiary, the Southwestern Cotton Co. reports that it has sold its last mule and is now entirely on a machine basis. Plowing that cost $2.25 an acre with mules now costs but $1.25 with tractors, and plowing and cultivating with motor-driven machines working day and night are likewise done more economically than heretofore.

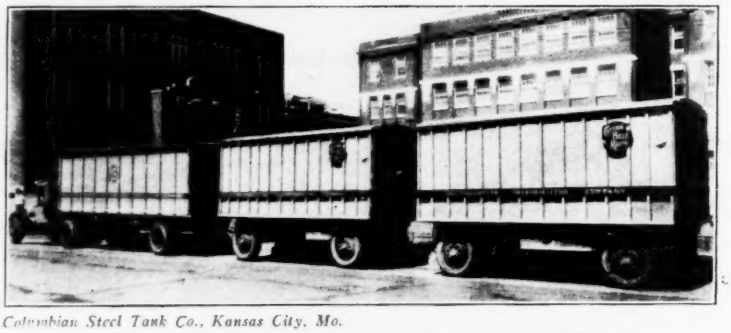
Salt River Valley farmers supply most of the long staple cotton used for fabric by southwest tire manufacturers, and they have been able to contract their 1929 crop of Pima long in advance at from 36 to 40 cents a pound; and the supply continues much below the demand. Half of the Salt River Valley acreage is in Pima, yielding about 375 pounds to the acre. In the Yuma Valley the acreage for the same grade is about 370 pounds. That cotton-picking machines still leave something to be desired is indicated by the fact that the crops are still almost wholly hand-picked. The demand for labor, mostly Mexican, continues large and the supply short. Average wages are $1.50 a day.

Box Cars Have Rubber Tires

As a means of eliminating short hauls and small deliveries on its lines, the Cotton Belt railroad is establishing a supplementary freight service with huge steel vans, to be drawn by truck tractors on the highways along its routes. The railroad has ordered a large fleet of these steel vans. They are sixteen feet long, seven feet wide, and seven feet high, inside measurements. Rear doors have piano type hinges, and a side opening has sliding doors. When loaded, they may be sealed to insure safety in transit. They are so constructed as to be practically dustproof while en route. The whole van, substructure, steel floor, side walls, and arched roof is of steel, with all its component parts welded into one piece by the new process of arc welding. Wood floors are laid over the steel base. These vans, exclusive of the Lapeer trailers upon which they are mounted, weigh around 3,000 pounds each. The trailers weigh 3,900 pounds each.

The first units delivered were mounted on 36 by 8 single pneumatic tires. On later units this equipment was changed to 38 by 9 single pneumatics.

They are designed to take a maximum load of 20,000 pounds.



Columbian Steel Tank Co., Kansas City, Mo.

Steel Freight Vans Equipped with Pneumatic Tires

Imports, Consumption, and Stocks

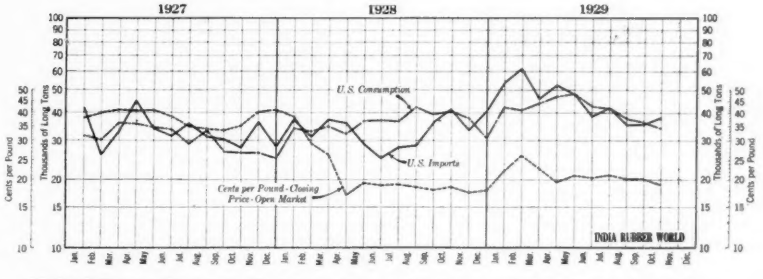
THE graphs of imports, consumption, and stocks are charted from official United States statistics by months for the years 1927 and 1928 and from January to October, 1929. The price graph represents official closing prices of the Rubber Trade Association of New York for spot ribbed smoked sheet rubber.

Imports for October were 38,163 tons or 5,663 tons more than the September figures. Consumption for October was 34,800 tons, practically the same as for September. October stocks on hand were reported as 88,483 tons, stocks afloat as 49,835 tons.

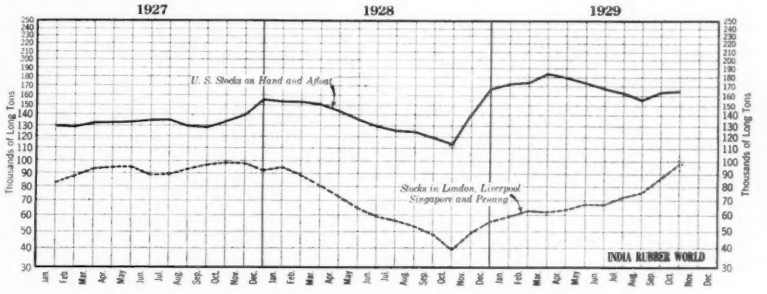
Unofficial statistical estimates for November are imports 42,000 tons, consumption 35,000 tons, and stocks at 95,000 tons.

London stocks between November 2 and November 23 steadily increased by about 1,000 tons per week. The weekly record is as follows: November 2, 48,092 tons; November 9, 49,302 tons; November 16, 50,068 tons; November 23, 51,012 tons.

The weekly record of stocks at Liverpool is as follows: November 2, 14,272 tons; November 9, 16,158 tons; November 16, 17,543 tons; November 23, 17,479 tons. It will be noted that the net increase from November 2 to 23 amounts to 3,207 tons.



United States Imports, Consumption, and Prices of Ribbed Smoked Sheets



United States, British and Malayan Rubber Stocks

United States Statistics of Rubber Imports, Consumption, and Stocks

Twelve Months	*Net Imports Tons	†Consumption Tons	‡Stocks on Hand Tons	§Stocks Afloat Tons	Total Domestic Stocks Tons	British and Malayan Stocks *London & Liverpool Tons	British and Malayan Stocks *Singapore & Penang Tons	British and Malayan Stocks Total Tons
1925	385,596	388,000	50,985	52,421	103,406	6,328	18,840	25,168
1926	399,972	366,000	72,510	51,238	123,748	51,320	26,443	77,763
1927	403,472	373,000	102,982	51,938	154,920	66,261	25,798	92,059
1928	407,572	437,000	73,554	92,837	166,391	22,603	32,905	55,508
1927								
January	42,167	31,694	82,923	47,020	129,943	57,065	25,440	82,505
February	26,312	30,306	78,929	48,542	127,471	61,170	26,760	87,936
March	33,207	36,343	75,793	55,561	131,354	65,634	27,843	93,477
April	45,118	36,073	84,838	47,010	131,848	69,798	24,543	94,341
May	34,135	34,787	84,186	48,531	132,717	76,099	25,133	95,232
June	31,695	33,991	81,890	52,280	134,170	66,887	21,898	88,785
July	36,116	29,383	88,623	45,664	134,287	66,776	22,568	89,344
August	31,349	33,647	86,325	42,745	129,070	67,836	25,764	93,600
September	30,264	27,367	89,222	38,230	127,452	71,505	25,178	96,683
October	28,126	26,942	90,406	42,292	132,698	72,584	25,790	98,374
November	36,619	26,943	100,082	39,517	139,599	69,896	28,369	98,265
December	28,424	25,524	102,982	51,938	154,920	66,261	25,798	92,059
1928								
January	37,552	34,065	106,469	46,441	152,910	68,660	25,868	94,528
February	31,415	33,370	104,514	48,044	152,558	65,307	22,867	88,174
March	37,468	35,335	106,647	43,378	150,025	60,405	20,538	80,943
April	36,175	32,450	110,372	32,783	143,155	55,910	16,946	72,856
May	29,112	36,965	102,519	33,145	135,664	46,882	17,687	64,569
June	25,567	37,305	90,781	38,392	129,173	41,091	18,207	59,298
July	28,362	37,040	82,103	42,943	125,046	37,818	18,663	56,481
August	28,827	42,505	68,425	54,904	123,329	34,364	18,971	53,335
September	36,800	39,490	65,735	52,692	118,427	33,673	14,898	48,571
October	41,667	40,455	66,947	45,646	112,593	26,600	12,149	38,749
November	33,846	37,095	63,698	75,502	139,200	19,988	29,188	49,176
December	40,781	30,925	73,554	92,037	165,591	22,603	32,905	55,508
1929								
January	53,992	42,530	84,946	92,480	177,426	28,966	29,617	58,583
February	61,331	41,137	105,140	74,891	180,031	29,659	32,373	62,032
March	46,391	44,238	107,293	75,848	183,141	32,540	29,437	61,977
April	52,520	47,000	112,813	66,119	178,932	35,958	27,339	63,297
May	48,475	48,692	112,596	59,526	172,122	35,828	31,932	67,760
June	38,821	42,753	108,664	57,948	166,612	35,575	31,861	67,436
July	41,114	41,069	108,709	52,078	160,787	35,599	35,473	71,072
August	35,397	37,854	106,252	48,434	154,686	43,165	33,124	76,289
September	32,500‡	34,325	104,427‡	58,954	163,381‡	52,238‡	34,291	86,529‡
October	38,163‡	34,800‡	88,483‡	49,835‡	138,318‡	65,460‡	33,770‡	99,230‡

*Official statistics. †Census Bureau figure 1925, Rubber Division survey figures other years; Rubber Manufacturers Association figures raised (from estimated 91 per cent) for months of 1929. ‡R. M. A. figures 1925 and 1926, calculated on basis of consumption and net imports thereafter. §R. M. A. figures 1925, calculated on basis official "rubber invoiced" statistics thereafter. ‡Provisional figure.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

Oct. 15. By "Pres. Van Buren," Far East.

	Cases
General Rubber Co.	1,711
Chas. T. Wilson Co., Inc.	250

Oct. 15. "Pres. Van Buren," Far East.

General Rubber Co.	1,561
B. W. Henderson & Co., Inc.	277
H. Muehlstein & Co., Inc.	605
Chas. T. Wilson Co., Inc.	669

Oct. 17. By "Markhor," Far East.

Bierrie & Co., Inc.	100
Hood Rubber Co.	*184
The Meyer & Brown Corp.	588
H. Muehlstein & Co., Inc.	168
Rogers Brown & Crocker Bros., Inc.	53
Chas. T. Wilson Co., Inc.	150

Oct. 19. By "City of Kobe," Far East.

H. A. Astlett & Co.	1,017
Robert Badenhop Corp.	250
Bierrie & Co., Inc.	253
Bierrie & Co., Inc.	*100
General Rubber Co.	1,014
B. W. Henderson & Co., Inc.	250
Lavino American & Asiatic Co.	200
Littlejohn & Co., Inc.	5,240
The Meyer & Brown Corp.	2,505
H. Muehlstein & Co., Inc.	650
Poel & Kelly, Inc.	1,935
Poel & Kelly, Inc.	*110
Rogers Brown & Crocker Bros., Inc.	590
Chas. T. Wilson Co., Inc.	571

Oct. 19. By "Karimoen," Far East.

H. A. Astlett & Co.	727
Robert Badenhop Corp.	150
Bierrie & Co., Inc.	50
General Rubber Co.	6,091
B. W. Henderson & Co., Inc.	364
Hood Rubber Co.	*50
The Meyer & Brown Corp.	245
H. Muehlstein & Co., Inc.	2,250
Poel & Kelly, Inc.	37
Chas. T. Wilson Co., Inc.	1,202

Oct. 19. By "Raby Castle," Far East.

H. A. Astlett & Co.	2,814
Robert Badenhop Corp.	922
Bierrie & Co., Inc.	530
General Rubber Co.	2,421
B. W. Henderson & Co., Inc.	350
Lavino American & Asiatic Co.	250
Littlejohn & Co., Inc.	13,619
The Meyer & Brown Corp.	1,084
H. Muehlstein & Co., Inc.	2,370
Poel & Kelly, Inc.	2,945
Raw Products Co.	80
Rogers Brown & Crocker Bros., Inc.	1,317
Rogers Brown & Crocker Bros., Inc.	*53
Chas. T. Wilson Co., Inc.	124

Oct. 20. By "Carmania," London.

Rogers Brown & Crocker Bros., Inc.	773

Oct. 20. By "Minnewaska," London.

H. Muehlstein & Co., Inc.	222
Rogers Brown & Crocker Bros., Inc.	222
Chas. T. Wilson Co., Inc.	156

Oct. 20. By "Modjokerto," Far East.

H. Muehlstein & Co., Inc.	†150

Oct. 21. By "Andania," Europe.

H. A. Astlett & Co.	150
Chas. T. Wilson Co., Inc.	103

Oct. 21 By "Jefferson," Far East.

Robert Badenhop Corp.	‡75

Oct. 21. By "Phemius," Far East.

H. A. Astlett & Co.	3,441
Robert Badenhop Co.	‡75
Bierrie & Co., Inc.	810
General Rubber Co.	1,701
Haldane & Co., Inc.	350
B. W. Henderson & Co., Inc.	250
Hood Rubber Co.	*67
Lavino American & Asiatic Co.	130
Littlejohn & Co., Inc.	4,875
The Meyer & Brown Corp.	799
The Meyer & Brown Corp.	*400

*Arrived at Boston.
†Arrived at Los Angeles.
‡Arrived at Victoria.

H. Muehlstein & Co., Inc.	4,810
Poel & Kelly, Inc.	580
Raw Products Co.	450
Rogers Brown & Crocker Bros., Inc.	910
Chas. T. Wilson Co., Inc.	694

Oct. 21. By "Volendam," Far East.

The Meyer & Brown Corp.	213
Raw Products Co.	pkgs. 303

Oct. 23. By "Silveray," Far East.

H. A. Astlett & Co.	†918
Littlejohn & Co., Inc.	†50
Poel & Kelly, Inc.	†300

Oct. 23. By "Unicoi," Far East.

H. A. Astlett & Co.	56
Bierrie & Co., Inc.	474
General Rubber Co.	112

Oct. 25. By "Salawatti," Far East.

H. A. Astlett & Co.	695
Robert Badenhop Corp.	579
Bierrie & Co., Inc.	250
General Rubber Co.	2,788
B. W. Henderson & Co., Inc.	146
Lavino American & Asiatic Co.	170
Littlejohn & Co., Inc.	8,182
The Meyer & Brown Corp.	625
The Meyer & Brown Corp.	*1,009
H. Muehlstein & Co., Inc.	500
Poel & Kelly, Inc.	950
Rogers Brown & Crocker Bros., Inc.	288
Rogers Brown & Crocker Bros., Inc.	*102
Chas. T. Wilson Co., Inc.	445

Oct. 25. By "Silver Elm," Far East.

General Rubber Co.	†750
H. Muehlstein & Co., Inc.	†136

Oct. 26. By "Degrasse," Far East.

General Rubber Co.	267

Oct. 26. By "Pres. Hayes," Far East.

H. A. Astlett & Co.	†300
Poel & Kelly, Inc.	†400

Oct. 26. By "Degrasse," Far East.

The Meyer & Brown Corp.	20

Oct. 28. By "Tuscania," London.

H. A. Astlett & Co.	906
Littlejohn & Co., Inc.	84
Rogers Brown & Crocker Bros., Inc.	271
Chas. T. Wilson Co., Inc.	70

Oct. 28. By "Yoseric," Far East.

Bierrie & Co., Inc.	813
Littlejohn & Co., Inc.	1,764
The Meyer & Brown Corp.	730
The Meyer & Brown Corp.	*1,700
H. Muehlstein & Co., Inc.	1,600
Chas. T. Wilson Co., Inc.	100

Oct. 29. By "City of Pittsburgh," Far East.

H. A. Astlett & Co.	140
Littlejohn & Co., Inc.	336

Oct. 29. By "Pres. Garfield," Far East.

H. A. Astlett & Co.	1,250
Robert Badenhop Corp.	850
Bierrie & Co., Inc.	156
General Rubber Co.	1,260
Haldane & Co., Inc.	1,500
Hood Rubber Co.	*176
Lavino American & Asiatic Co.	100
Littlejohn & Co., Inc.	1,023
The Meyer & Brown Corp.	655
H. Muehlstein & Co., Inc.	1,460
Poel & Kelly, Inc.	600
Rogers Brown & Crocker Bros., Inc.	915
Rogers Brown & Crocker Bros., Inc.	*250
Chas. T. Wilson Co., Inc.	758

Oct. 30. By "Voltaire," Far East.

General Rubber Co.	21

Oct. 31. By "Malayan Prince," Far East.

H. A. Astlett & Co.	1,790
Robert Badenhop Corp.	425
Bierrie & Co., Inc.	857
General Rubber Co.	3,697
Haldane & Co., Inc.	750
Littlejohn & Co., Inc.	5,913
The Meyer & Brown Corp.	1,236
H. Muehlstein & Co., Inc.	384
Poel & Kelly, Inc.	785
Raw Products Co.	330
Rogers Brown & Crocker Bros., Inc.	1,076
Chas. T. Wilson Co., Inc.	611

Oct. 31. By "Silverbelle," Far East.

	Cases
H. A. Astlett & Co.	1,909
Robert Badenhop Corp.	100
Bierrie & Co., Inc.	540
General Rubber Co.	1,481
Haldane & Co., Inc.	750
Hood Rubber Co.	*117
Lavino American & Asiatic Co.	210
Littlejohn & Co., Inc.	5,265
The Meyer & Brown Corp.	1,148
The Meyer & Brown Corp.	*500
H. Muehlstein & Co., Inc.	396
Poel & Kelly, Inc.	2,265
Poel & Kelly, Inc.	*165
Rogers Brown & Crocker Bros., Inc.	2,006
Chas. T. Wilson Co., Inc.	788

Nov. 2. By "Myrtlebank," Far East.

H. A. Astlett & Co.	3,692
Robert Badenhop Corp.	512
Bierrie & Co., Inc.	1,400
General Rubber Co.	2,104
B. W. Henderson & Co., Inc.	550
Lavino American & Asiatic Co.	40
Littlejohn & Co., Inc.	1,247
The Meyer & Brown Corp.	1,448
H. Muehlstein & Co., Inc.	661
Poel & Kelly, Inc.	2,533
Raw Products Co.	50
Rogers Brown & Crocker Bros., Inc.	*140

Nov. 3. By "Pres. Grant," Far East.

Bierrie & Co., Inc.	†250
Poel & Kelly, Inc.	†250

Nov. 4. By "Cedric," London.

Chas. T. Wilson Co., Inc.	41

Nov. 4. By "Clan MacBean," Far East.

H. A. Astlett & Co.	40

Nov. 4. By "Minnetonka," Far East.

General Rubber Co.	700
Littlejohn & Co., Inc.	1,471
Rogers Brown & Crocker Bros., Inc.	132
Chas. T. Wilson Co., Inc.	159

Nov. 4. By "Pres. Lincoln," Far East.

Robert Badenhop Corp.	75

Nov. 4. By "St. Louis," Far East.

General Rubber Co.	145
The Meyer & Brown Corp.	50

Nov. 5. By "Aurania," Far East.

B. W. Henderson & Co., Inc.	519

Nov. 5. By "City of Salisbury," Far East.

H. A. Astlett & Co.	1,803
Robert Badenhop Corp.	2,165
Bierrie & Co., Inc.	220
General Rubber Co.	2,002
Haldane & Co., Inc.	1,245
Hood Rubber Co.	*67
Littlejohn & Co., Inc.	4,363
The Meyer & Brown Corp.	140
The Meyer & Brown Corp.	*135
Poel & Kelly, Inc.	1,055
Rogers Brown & Crocker Bros., Inc.	1,298
Rogers Brown & Crocker Bros., Inc.	*250
Chas. T. Wilson Co., Inc.	522

Nov. 6. By "American Shipper," Far East.

General Rubber Co.	128

Nov. 6. By "City of Guilford," Far East.

Bierrie & Co., Inc.	†487
General Rubber Co.	860
Hood Rubber Co.	*184
Littlejohn & Co., Inc.	760
The Meyer & Brown Corp.	112
Chas. T. Wilson Co., Inc.	468

Nov. 6. By "Kendal Castle," Far East.

H. A. Astlett & Co.	728
Robert Badenhop Corp.	3,212
Bierrie & Co., Inc.	206
General Rubber Co.	1,960
Haldane & Co., Inc.	530
Littlejohn & Co., Inc.	6,930
The Meyer & Brown Corp.	2,470
H. Muehlstein & Co., Inc.	12,196
Poel & Kelly, Inc.	2,585
Poel & Kelly, Inc.	*100
Raw Products Co.	280
Rogers Brown & Crocker Bros., Inc.	2,178
Rogers Brown & Crocker Bros., Inc.	280
Chas. T. Wilson Co., Inc.	1,079

Nov. 6. By "Steel Seafarer," Far East.

H. A. Astlett & Co.	1,282
Robert Badenhop Corp.	900
Bierrie & Co., Inc.	210
General Rubber Co.	3,066
Haldane & Co., Inc.	100
Lavino American & Asiatic Co.	50
Littlejohn & Co., Inc.	1,461
The Meyer & Brown Corp.	570

	Cases
H. Muehlstein & Co., Inc.	135
Poel & Kelly, Inc.	550
Rogers Brown & Crocker Bros., Inc.	280
Chas. T. Wilson Co., Inc.	175
Nov. 7. By "Steel Exporter," Far East.	
General Rubber Co.	560
Chas. T. Wilson Co,. Inc.	192
Nov. 11. By "City of Canberra," Far East.	
H. A. Astlett & Co.	730
Robert Badenhop Corp.	1,050
Bierrie & Co., Inc.	420
General Rubber Co.	2,245
Haldane & Co., Inc.	250
Lavino American & Asiatic Co.	100
Littlejohn & Co., Inc.	4,220
The Meyer & Brown Corp.	1,970
H. Muehlstein & Co., Inc.	610
Poel & Kelly, Inc.	1,485
Raw Products Co.	430
Rogers Brown & Crocker Bros., Inc.	797
Chas. T. Wilson Co,. Inc.	562
Nov. 12. By "Blitar," Far East.	
H. A. Astlett & Co.	185
Bierrie & Co., Inc.	304
General Rubber Co.	3,654
Haldane & Co., Inc.	50
Littlejohn & Co., Inc.	905
The Meyer & Brown Corp.	1,510
Poel & Kelly, Inc.	595
Rogers Brown & Crocker Bros., Inc.	929
Rogers Brown & Crocker Bros., Inc.	*140
Nov. 12. By "Maihar," Far East.	
Robert Badenhop Corp.	100
Bierrie & Co., Inc.	112
General Rubber Co.	378
Adolph Hirsch & Co., Inc.	128
Littlejohn & Co., Inc.	112
The Meyer & Brown Corp.	112
H. Muehlstein & Co., Inc.	720
Rogers Brown & Crocker Bros., Inc.	112
Chas. T. Wilson Co., Inc.	200

*Arrived at Boston.
†Arrived at Los Angeles.
§Estimated.

	Cases
Nov. 12. By "Minnekahda," Far East.	
General Rubber Co.	30
Littlejohn & Co., Inc.	124
Chas. T. Wilson Co., Inc.	225
Nov. 12. By "Napierian," London.	
Hood Rubber Co.	*138
Nov. 12. By "New York," Far East.	
General Rubber Co.	68
Nov. 12. By "Pres. Polk," Far East.	
H. A. Astlett & Co.	850
Robert Badenhop Corp.	250
Bierrie & Co., Inc.	150
General Rubber Co.	§1,099
Adolph Hirsch & Co., Inc.	45
Hood Rubber Co.	*150
Lavino American & Asiatic Co.	300
Littlejohn & Co., Inc.	4,202
The Meyer & Brown Corp.	410
The Meyer & Brown Corp.	*650
H. Muehlstein & Co., Inc.	210
Poel & Kelly, Inc.	1,395
Rogers Brown & Crocker Bros., Inc.	1,405
Chas. T. Wilson Co., Inc.	468
Nov. 13. By "Batoe," Far East.	
H. A. Astlett & Co.	†750
Haldane & Co., Inc.	†207
Nov. 13. By "Mercier," Far East.	
The Meyer & Brown Corp.	15
Nov. 14. By "Matra," Far East.	
Hood Rubber Co.	92
Nov. 15. By "Blydendyk," Far East.	
H. A. Astlett & Co.	571
Bierrie & Co., Inc.	66
Littlejohn & Co., Inc.	534
The Meyer & Brown Corp.	400
H. Muehlstein & Co., Inc.	680
Rogers Brown & Crocker Bros., Inc.	1,092

	Cases
Nov. 15. By "Royal Prince," Far East.	
Robert Badenhop Corp.	2,985
Bierrie & Co., Inc.	300
General Rubber Co.	§1,031
Haldane & Co., Inc.	160
Littlejohn & Co., Inc.	6,794
The Meyer & Brown Corp.	1,249
H. Muehlstein & Co., Inc.	620
Poel & Kelly, Inc.	1,525
Rogers Brown & Crocker Bros., Inc.	3,314
Nov. 15. By "Taiyo Maru," Far East.	
H. A. Astlett & Co.	†250
Littlejohn & Co., Inc.	†50
Poel & Kelly, Inc.	†600

Africans

Oct. 21. By "Andania," Europe.	
Littlejohn & Co., Inc.	29

Balata

Oct. 28. By "Denis," South America.	
General Rubber Co.	2
Oct. 29. By "Nickerie," Paramaribo.	
Middleton & Co., Ltd.	40

Guayule

Oct. 18. By "Costen," Mexico.	
Continental Rubber Co. of N. Y.	560
Oct. 24. By "Canto," Mexico.	
Continental Rubber Co. of N. Y.	560
Oct. 29. By "Oceano," Mexico.	
Continental Rubber Co. of N. Y.	560
Nov. 1. By "El Alba," Mexico.	
Continental Rubber Co. of N. Y.	560
Nov. 15. By "Camaguey," Mexico.	
Continental Rubber Co. of N. Y.	560

Rubber Latex

Oct. 19. By "Karimoen," Far East.	
General Rubber Co.	gals. 71,550
Nov. 6. By "Kendal Castle," Far East.	
General Rubber Co.	gals. 37,886
Nov. 6. By "Steel Seafarer," Far East.	
General Rubber Co.	gals. 65,264

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
Oct. 11. By "Cuthbert," South America.					
H. A. Astlett & Co.	200	....	....	....	....
Oct. 28. By "Denis," South America.					
H. A. Astlett & Co.	559	....	....	....	....
General Rubber Co.	21	....	....	....	....
Littlejohn & Co., Inc.	629	....	....	....	....
The Meyer & Brown Corp.	124	....	....	....	....
Nov. 6. By "Berury," South America.					
H. A. Astlett & Co.	232	....	....	....	....
Nov. 13. By "Swinburne," South America.					
Paul Bertuch & Co., Inc.	27	34	3	....	....
General Rubber Co.	251	....	....	....	....
Littlejohn & Co., Inc.	627	....	....	....	....
The Meyer & Brown Corp.	299	....	....	....	....

United States Crude and Waste Rubber Imports for 1929 by Months

	Plantations	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1929	Total 1928	Balata	Miscellaneous	Waste
January ..... *tons*	51,202	1,055	30	5	....	13	52,305	46,243	67	799	181
February	63,851	530	60	97	....	..	64,538	29,445	80	1,220	319
March	51,661	2,112	15	36	....	..	53,824	40,894	85	825	70
April	53,256	844	8	4	59	..	54,171	37,240	87	1,606	609
May	47,940	1,078	54	49	59	..	49,180	32,883	88	1,013	230
June	43,313	1,032	44	1	100	..	44,490	25,792	91	1,323	215
July	43,130	931	..	57	134	..	44,252	33,382	75	1,044	274
August	37,572	572	5	9	134	..	38,292	29,805	102	1,031	166
September	31,849	473	60	58	75	..	32,515	46,662	48	755	275
October	42,697	512	33	18	465	..	43,725	42,515	91	994	160
Total ten months, 1929 ..... *tons*	466,471	9,139	309	334	1,026	13	477,292	.....	814	10,610	2,499
Total ten months, 1928 ..... *tons*	349,934	9,980	1,099	483	3,364	1	.....	364,861	1,014	8,504	2,171

Compiled from Rubber Manufacturers Association statistics.

London Stocks, September, 1929

London	Landed for Sept. Tons	Delivered for Sept. Tons	Stocked September 30 1929 Tons	1928 Tons	1927 Tons
Plantation	12,793	6,250	42,041	31,334	68,052
Other grades	....	....	54	75	120
Liverpool					
Plantation	†3,566	†1,047	†10,026	†2,233	†3,269
Total tons, London and Liverpool	16,359	7,297	52,121	33,642	71,441

†Official returns from the recognized public warehouses.

Plantation Rubber Exports from Malaya*

	January 1, to August 31, 1929 From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	9,084.00	9,374.00	7,304.00
British Possessions	3,567.00	971.00	385.00
Continent of Europe	17,925.00	3,686.00	4,883.00
United States	122,195.00	33,766.00	14,254.00
Japan	13,284.00	120.00	846.00
Other countries	649.00	84.00	10.00
Totals	166,704.00	48,001.00	27,682.00

*Excluding all foreign transhipments.

World Rubber Absorption

Long Tons

Consumption	Calender Years 1927	1928	12 Months' Running Totals, 1929 June	July	August	September
United States	373,000	437,000	493,860	497,889	493,238	488,073
United Kingdom	44,800	48,504	57,143	61,071	63,739	*66,786
Net Imports						
Australia	9,516	8,430	12,256	14,583	14,600	14,850
Belgium	6,491	7,958	8,473	8,617	9,000	9,075
Canada	26,386	30,447	37,128	37,641	38,073	*38,000
France	34,274	36,498	51,083	52,404	53,522	*53,500
Germany	38,892	37,855	47,125	47,297	48,635	49,576
Italy	11,290	12,433	15,988	16,413	16,446	16,392
Japan	20,521	25,621	29,942	30,304	32,099	*32,000
Russia	12,695	15,134	8,290	*8,300	*8,300	*9,000
Other reported	7,908	10,365	13,090	13,260	13,474	*13,000
Other estimated	8,093	*10,820	*11,000	*11,000	*11,000	*11,000
Grand total	593,866	681,065	785,378	798,779	802,126	801,252
Minus United States	373,000	437,000	493,860	497,889	493,238	488,073
Total foreign	220,866	244,065	291,518	300,890	308,888	313,179

*Provisional figure.

Tire Production Statistics

High Pressure Pneumatic Casings

	All Types Inventory	Production	Total Shipments	Cord Inventory	Production	Total Shipments
1928	.....	58,457,863	55,721,937	.....	19,302,218	19,351,380
1929						
January	10,284,158	5,041,530	4,969,647	3,651,041	1,563,554	1,461,104
February	11,620,960	5,183,693	3,961,751	4,073,644	1,373,691	974,185
March	12,263,816	5,639,426	5,031,101	4,330,747	1,397,657	1,157,188
April	12,696,808	5,912,854	5,470,779	4,292,167	1,305,224	1,335,121
May	13,386,440	6,109,026	5,388,291	4,285,674	1,371,987	1,356,529
June	13,467,567	5,477,771	5,440,693	3,956,799	1,249,596	1,594,201
July	11,872,330	4,856,241	5,891,020	3,325,494	1,162,182	1,690,264
August	10,669,370	4,354,353	5,883,561	2,773,039	1,055,483	1,681,389
September	9,656,392	3,568,200	4,498,772	2,351,815	905,555	1,315,845

	Balloon Casings Inventory	Production	Total Shipments	Solid and Cushion Tires Inventory	Production	Total Shipments
1928	.....	38,878,218	35,931,982	.....	508,223	512,602
1929						
January	6,583,958	3,470,596	3,499,121	149,240	31,583	33,051
February	7,472,592	3,796,660	2,976,698	145,811	29,747	31,463
March	7,858,642	4,229,586	3,863,650	141,902	35,441	40,205
April	8,346,727	4,601,986	4,123,769	137,613	38,419	43,130
May	9,047,376	4,732,416	4,022,910	133,654	39,611	42,414
June	9,471,532	4,223,335	3,829,506	131,633	39,741	40,355
July	8,515,634	3,689,616	4,192,894	127,653	38,470	40,781
August	7,869,710	3,293,595	4,192,328	117,313	32,114	42,653
September	7,266,230	2,655,594	3,173,529	110,596	27,702	36,125

	High Pressure Inner Tubes Inventory	Production	Total Shipments	Balloon Inner Tubes Inventory	Production	Total Shipments
1928	.....	23,255,891	23,749,966	.....	36,878,990	34,095,223
1929						
January	4,734,477	1,540,272	1,800,676	6,805,018	3,347,660	3,630,579
February	5,159,171	1,398,156	1,046,042	7,572,752	3,675,116	2,908,406
March	5,356,289	1,475,822	1,276,490	7,938,587	4,120,493	3,773,585
April	5,220,167	1,347,128	1,447,504	8,369,244	4,375,920	3,921,768
May	5,017,011	1,155,013	1,480,293	9,167,038	4,586,606	3,795,350
June	4,384,077	1,177,147	1,698,896	9,654,688	4,049,173	3,510,947
July	3,540,819	1,382,118	2,135,297	8,692,058	3,249,014	3,945,727
August	2,927,371	1,534,547	2,207,751	7,673,503	2,846,491	3,926,368
September	2,785,533	1,549,926	1,675,954	7,258,870	2,598,062	3,008,065

Cotton and Rubber Consumption
Casings, Tubes, Solid and Cushion Tires

	Cotton Fabric Pounds	Crude Rubber Pounds
1928	222,243,398	600,423,401
1929		
January	19,779,481	54,160,529
February	20,326,530	57,558,636
March	21,238,410	61,335,423
April	23,619,687	65,673,453
May	23,302,120	66,028,029
June	20,358,937	56,861,320
July	18,125,761	52,249,004
August	15,802,783	45,458,603
September	13,469,050	39,981,294

Rubber Manufacturers Association figures representing 75 per cent of the industry.

Rubber Seals Drum Flanges

Metal drums or barrels of two or three sections used for packaging oils or other very mobile fluids are made by a new process in which the edges of the sections are given U-shaped flanges which hook into each other and are made leak-proof by squirting into the joints a sealing material for which the following is given as an efficient formula: Crepe rubber, 46.6 per cent; calcium carbonate, 46.6; zinc oxide, 4.7; sulphur, 1.8; tetra-methyl-thiuram-disulphide, 0.3; and sufficient benzol to equal the weight of the other ingredients.

World Rubber Production—Net Exports

Long Tons—1929

British Malaya:	Total 1928	May	June	July	Aug.	Sept.	Oct.
Gross exports	409,500	43,960	40,398	46,454	50,441	53,484	47,937
Imports	149,787	15,593	14,344	15,071	15,469	12,392	12,516
Net	259,713	28,367	26,054	31,383	34,972	41,092	35,421
Ceylon	57,267	4,850	6,051	5,746	5,564	7,961	8,411
India and Burma	10,790	800	1,122	974	685	384	.....
Sarawak	10,087	966	1,061	1,247	993	832	1,047
B. N. Borneo	6,698	548	547	*500	*500	*500	*500
Siam	4,813	453	422	462	431	406	485
Java and Madura	58,848	6,264	5,582	6,422	4,664	4,708	.....
Sumatra E. Coast	82,511	6,961	6,693	7,192	7,298	7,517	.....
Other N. E. Indies	121,671	13,437	11,270	13,995	10,782	10,149	.....
French Indo-China	9,616	650	608	555	545	755	893
Amazon Valley	21,129	1,922	1,398	1,457	1,563	1,566	1,606
Other America	1,490	64	5	148	24	.....	.....
Mexican Guayule	3,076	125	145	200	190	107	200
Africa	6,124	544	*398	295	285	.....	.....
Totals	653,833	65,951	61,356	70,576	68,496	.....	.....

*Estimated.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Reported Rubber Stocks

Long Tons—1929

Producing Centers	May	June	July	Aug.	Sept.	Oct.
Singapore	26,764	25,641	28,950	26,496	28,248	28,582
Penang	5,168	6,220	6,523	6,628	6,043	6,365
Para	3,310	4,475	3,658	3,678	3,462	2,955
Totals	35,242	36,336	39,131	36,802	37,753	.....
Manufacturing Centers						
London	31,290	31,025	30,080	35,642	42,188	.....
Liverpool	4,538	4,550	4,661	7,507	10,026	.....
Amsterdam	1,315	1,560	1,569	1,867	2,203	.....
United States	97,192	92,062	95,536	90,769	84,362	88,483
Plantations afloat*	83,290	80,020	83,412	87,219	94,252	.....
Totals	217,625	209,217	215,258	223,004	233,031	.....
Grand totals	252,867	245,553	254,389	259,806	270,784	.....

*W. H. Rickinson & Son, *The World's Rubber Position.*
Compiled by Rubber Division Department of Commerce, Washington, D. C.

British Malaya

RUBBER EXPORTS

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57, Charing Cross, London, S. W. 1, England, states that the amount of rubber exported from British Malaya in October, 1929, totaled 47,937 tons, as compared with 53,484 tons in September last, and 24,441 tons in the corresponding period of 1928. The amount of rubber imported was 12,516 tons, of which 9,171 tons were declared as wet rubber. The following are comparative statistics:

	1928 Gross Exports Tons	1928 Foreign Imports Tons	1929 Gross Exports Tons	1929 Foreign Imports Tons
January	27,731	16,618	52,546	13,415
February	28,813	12,911	47,926	12,103
March	27,813	10,508	49,448	14,553
April	20,029	9,335	49,816	11,414
May	26,403	10,350	43,960	15,593
June	22,930	16,168	40,398	14,344
July	30,405	13,383	46,454	15,071
August	35,593	15,114	50,441	15,469
September	29,700	11,239	53,484	12,392
October	24,441	12,603	47,937	12,516
Totals	273,858	128,229	482,410	136,870

The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of September and October:

	September, 1929 Tons	October, 1929 Tons
United Kingdom	13,849	10,063
United States	29,952	29,230
Continent of Europe	5,092	4,972
British Possessions	828	685
Japan	3,674	2,942
Other foreign countries	89	45
Totals	53,484	47,937

Low and High New York Spot Prices

	November 1929*	1928	1927
PLANTATIONS			
First latex crepe	$0.16½@$0.19⅛	$0.18⅝@$0.19¼	$0.35⅜@$0.41½
Smoked sheet, ribbed	.15¾@ .18⅛	.17⅝@ .18¾	.35¼@ .41¾
PARAS			
Upriver fine	.16½@ .19¼	.19 @ .20½	.28 @ .35½
Upriver coarse	.08¼@ .10½	.13 @ .14½	.21¼@ .28
Upper caucho ball	.08¼@ .10½	.12 @ .13½	.21¼@ .28

*Figured to November 23, 1929.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	August, 1929		Eight Months Ended August, 1929	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*Free*				
Crude rubber	83,377,154	$16,530,090	*903,638,918	*$173,166,391
Liquid latex	1,409,738	300,462	.....	.....
Jelutong or Pontianak	1,287,322	171,733	12,369,527	1,657,844
Balata	129,861	47,769	1,328,721	461,326
Gutta percha	.....	.....	777,504	140,539
Guayule	425,200	80,443	1,664,200	324,927
Siak, scrap, and reclaimed	1,730,096	29,785	14,481,597	285,415
Totals	88,359,371	$17,160,282	934,260,467	$176,036,442
Chicle *dutiable*	17,583	$8,819	8,461,499	$4,203,055
MANUFACTURED—*Dutiable*				
Belting	5,303	$2,644	26,098	$16,500
Tires	182	2,871	1,670	28,422
Other rubber manufactures	.....	212,882	.....	1,547,199
Totals	5,485	$218,397	27,768	$1,592,121

EXPORTS OF FOREIGN MERCHANDISE

RUBBER AND MANUFACTURES				
Crude rubber	5,921,715	$1,232,217	58,657,594	$12,509,522
Balata	17,191	8,745	212,371	97,104
Gutta percha, rubber substitutes, and scrap	.....	.....	75,613	6,598
Rubber manufactures	.....	118,863	.....	448,187
Totals	5,938,906	$1,359,825	58,945,578	$13,061,411

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	1,926,593	$136,521	20,459,220	$1,435,892
Scrap and old	4,390,159	179,905	35,618,020	1,705,881
Rubberized automobile cloth, *sq. yd.*	96,009	55,435	1,533,383	789,028
Other rubberized piece goods and hospital sheeting *sq. yd.*	85,621	42,585	1,259,086	560,262
Footwear				
Boots *pairs*	178,325	359,671	821,961	1,800,246
Shoes *pairs*	298,890	325,927	1,428,517	1,259,151
Canvas shoes with rubber soles *pairs*	737,757	469,747	5,366,611	3,550,581
Soles *doz. pairs*	41,063	61,400	118,570	285,775
Heels *doz. pairs*	115,588	79,631	1,023,878	734,924
Water bottles and fountain syringes *number*	36,096	25,505	259,147	172,393
Gloves *doz. pairs*	7,150	19,631	80,737	205,677
Other druggists' sundries	.....	37,719	.....	267,657
Balloons *gross*	78,908	85,671	500,987	521,402
Toys and balls	.....	23,307	.....	134,762
Bathing caps *doz.*	9,460	22,287	158,989	343,870
Bands	41,042	22,598	330,870	177,660
Erasers	44,241	27,560	388,673	251,168
Hard rubber goods				
Electrical goods	174,925	24,816	1,602,967	199,310
Other goods	.....	28,482	.....	313,092
Tires				
Truck and bus casings, 6 inches and over *number*	20,106	550,564	186,146	5,294,190
Other automobile casings, *number*	199,271	1,941,944	1,818,941	18,883,734
Tubes, auto *number*	140,848	245,647	1,338,548	2,426,725
Other casings and tubes, *number*	5,179	12,350	143,046	373,056
Solid tires for automobiles and motor trucks, *number*	5,281	98,318	34,122	957,668
Other solid tires	76,210	16,101	1,239,943	223,737
Tire accessories	.....	154,338	.....	1,170,602
Rubber and friction tape	116,008	33,340	1,167,795	343,128
Belting	414,167	228,630	3,823,295	2,056,899
Hose	754,888	245,259	6,234,118	2,089,940
Packing	177,277	83,185	1,819,148	820,867
Thread	150,304	146,180	1,144,548	1,172,291
Other rubber manufactures	.....	220,182	.....	2,275,951
Totals	.....	$6,004,436	.....	$52,797,519

*Liquid latex included.

Crude Rubber Imports by Customs Districts

	*September, 1929		Nine Months Ended *September, 1929	
	Pounds	Value	Pounds	Value
Vermont	.....	.....	2,000	$400
Massachusetts	2,737,048	$539,717	30,248,909	5,724,431
New York	65,980,086	13,057,025	827,158,625	159,272,065
Philadelphia	1,511,613	291,341	6,265,329	1,207,276
Pittsburgh	2,240	583	2,240	583
Maryland	838,142	151,173	17,464,999	3,212,760
Los Angeles	2,009,516	376,436	57,133,024	11,107,567
San Francisco	71,701	17,500	1,275,790	265,370
Oregon	.....	.....	123,207	22,364
Washington	6,720	1,440	33,415	6,825
Michigan	.....	.....	144,164	29,914
Ohio	4,623,126	901,741	38,266,837	6,981,277
Colorado	203,603	43,664	3,487,026	712,485
Chicago	.....	.....	17,148	3,430
Totals	77,983,795	$15,380,620	981,622,713	$188,546,747

*Including latex, dry rubber content.

United Kingdom Statistics

IMPORTS

	September, 1929		Nine Months Ended September, 1929	
UNMANUFACTURED	Pounds	Value	Pounds	Value
Crude Rubber				
From—				
Straits Settlements	24,770,500	£1,079,052	130,645,100	£5,761,013
Federated Malay States	7,433,500	324,748	52,377,000	2,341,818
British India	1,320,000	60,748	8,966,800	402,440
Ceylon and Dependencies	5,008,100	218,180	29,621,500	1,342,794
Other Dutch possessions in Indian Seas	2,178,600	92,254	18,309,200	834,813
Dutch East Indies (except other Dutch possessions in Indian Seas)	3,696,300	161,406	23,925,900	1,073,276
Other countries in East Indies and Pacific not elsewhere specified	298,500	13,243	1,956,300	87,669
Brazil	736,100	34,143	5,702,500	256,789
South and Central America (except Brazil)	.....	.....	123,400	5,426
West Africa				
French West Africa	17,000	688	113,400	3,603
Gold Coast	17,700	821	285,700	13,179
Other parts of West Africa	172,300	7,315	1,597,100	66,866
East Africa, including Madagascar	93,000	3,942	653,700	28,811
Other countries	380,100	16,245	1,410,800	63,050
Totals	46,121,700	£2,012,785	275,688,400	£12,281,547
Gutta percha and balata	228,400	18,005	2,978,600	234,586
Waste and reclaimed rubber	915,400	10,330	8,850,300	107,066
Rubber substitutes	2,400	66	68,300	1,718
Totals	47,267,900	£2,041,186	287,585,600	£12,624,917
MANUFACTURED				
*††Tires and tubes				
Pneumatic				
Outer covers	.....	£28,986	.....	£366,954
Inner tubes	.....	5,029	.....	68,453
Solid tires	.....	8,289	.....	72,284
Boots and shoes *doz. pairs*	52,649	162,151	894,101	1,278,176
Other rubber manufactures	.....	160,585	.....	1,517,441
Totals	.....	£365,040	.....	£3,303,308

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	2,649,300	£17,773	26,063,700	£196,973
Rubber substitutes	52,700	1,159	691,700	14,293
Totals	2,702,000	£18,932	26,755,400	£211,266
MANUFACTURED				
‡Tires and tubes				
Pneumatic				
Outer covers	.....	£270,168	.....	£2,546,127
Inner tubes	.....	49,822	.....	400,080
Solid tires	.....	11,725	.....	118,802
Boots and shoes *doz. pairs*	34,392	60,414	256,981	402,075
Other rubber manufactures	.....	196,927	.....	2,170,646
Totals	.....	£589,056	.....	£5,637,730

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	1,142,000	£51,467	6,242,900	£275,511
Sweden, Norway, and Denmark	202,900	10,312	1,623,900	79,578
Germany	3,415,000	142,475	25,487,100	1,124,362
Belgium	940,600	44,275	7,074,400	321,476
France	926,000	44,867	31,411,900	1,428,461
Spain	32,700	1,577	831,500	38,939
Italy	276,600	12,632	6,730,400	318,385
Other European countries	701,000	35,068	5,077,000	242,880
United States	183,600	8,504	8,107,000	336,219
Canada	.....	.....	4,100	195
Other countries	197,800	9,721	1,683,100	87,830
Totals	8,018,200	£360,898	94,273,300	£4,253,836
Gutta percha and balata	33,100	2,480	695,600	52,870
Waste and reclaimed rubber	3,600	84	149,100	2,431
Rubber substitutes	.....	.....	4,500	104
Totals	8,054,900	£363,462	95,122,500	£4,309,241
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	.....	£4,527	.....	£48,431
Inner tubes	.....	1,095	.....	9,923
Solid tires	.....	14	.....	1,059
Boots and shoes *doz. pairs*	1,241	2,402	12,341	25,382
Other rubber manufactures	.....	7,565	.....	72,230
Totals	.....	£15,603	.....	£157,025

*After April 12, 1927, tires and tubes imported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

†Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until Apr. 30, 1926, inclusive, and rubber tires and tubes until Apr. 11, 1927, inclusive.

‡Tires and tubes included prior to Apr. 12, 1927.

Dealers' Stocks of Automobile Tires

As of October 1, 1929[1]

FINAL statistics compiled by the Rubber Division, and here tabulated, show the stocks of automobile casings, inner tubes, and solid and cushion tires held by dealers reporting on October 1, 1929, as compared to October 1, 1928. The final average number of casings per dealer is 68.4, an increase of 0.7 casings over the average in the preliminary report issued on October 14, 1929.

An analysis has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of October 1, 1928. This year a smaller percentage of reports fell into the class of dealers having less than 10 casings in stock, a greater percentage of reports falling into the classes of dealers having more than 200 casings.

The number of dealers reporting stocks of solid or cushion tires on October 1, 1929, was 1,032, and the number of such tires reported on hand was 24,940, an average of 24.2 per dealer. This compares with 974 dealers on October 1, 1928, reporting 22,793 tires, or 23.4 tires per dealer.

Dealers were asked to report whether they were handling one, two, three, or more makes of tires. An analysis of the reports shows a greater percentage of dealers concentrating sales efforts on one make than in preceding years.

In the present survey dealers were requested to indicate the approximate percentage which sales of automobile tires and inner tubes bore to sales of merchandise and service, and the results of this question are as follows: Of a total of 26,057 replies, 21,667, or 83.15 per cent, declared the percentage to total business by tires and tubes was under 25; 2,874, or 11.03 per cent, admitted a percentage of from 25 to 50; 704, or 2.7 per cent, stated a percentage of from 50 to 75; and 812, or 3.12 per cent, had a percentage of over 75.

The average number of inner tubes was 103.4.

A special analysis of returns received up to October 12 from Alabama, Arizona, California, Illinois, New York, North Carolina, Pennsylvania, and Texas, was made to determine the relative importance of different groups of dealers in tire distribution. The analysis is representative of all sections of the country, although covering only 7,295 of the 26,057 forms received. Of 7,295 dealers with average stocks of 72.55 tires each, 5,409 dealers with average stocks of 79.99 tires each were in the group selling automobiles or batteries, or vulcanizing tires. The automobile dealers stocks of casings averaged only 61.41 per dealer, the battery dealers' stocks averaged 73.98 casings per dealer, and the vulcanizers' stocks averaged 152.67 casings per dealer; the tire dealers with vulcanizing equipment are on the average larger dealers than those selling batteries or automobiles, though much fewer in number. Only 75 per cent of the dealers selling automobiles sell batteries, and over 58 per cent with vulcanizing equipment sell batteries.

Dealers' Stocks of Automobile Tires

	October 1, 1928			October 1, 1929		
	Number	Dealers Reporting	Average per Dealer	Number	Dealers Reporting	Average per Dealer
Total casings	1,685,685	26,012	64.8	1,739,043	25,417	68.4
Balloon casings	764,187	17,378	44.0	1,280,042	(a)	....
High pressure casings	921,502	(a)	....	459,001	20,045	22.9
Inner tubes	2,750,768	25,616	107.4	2,592,355	25,079	103.4
Solids, etc.	22,793	974	23.4	24,940	1,032	24.2

(a) Number of dealers not tabulated separately.

DEALERS' STOCKS OF AUTOMOBILE TIRES BY STATES, OCTOBER 1, 1929

	Total Casings			High Pressure		Inner Tubes		
	No. of Dealers Reporting	No. of Tires on Hand	Average No. Per Dealer	No. of Dealers Reporting	No. of Tires on Hand	No. of Dealers Reporting	No. of Tubes on Hand	Average No. Per Dealer
New England								
Maine	343	14,135	41.2	263	4,065	343	24,258	70.7
New Hampshire	164	9,962	60.7	132	2,617	168	15,707	93.5
Vermont	41	2,681	65.4	30	876	39	4,122	105.6
Massachusetts	638	52,850	82.8	480	12,234	641	74,049	115.5
Rhode Island	104	7,335	70.5	69	1,688	106	11,343	107.0
Connecticut	284	19,091	67.2	231	4,228	272	27,282	100.3
Middle Atlantic								
New York	1,485	115,886	78.0	1,145	27,476	1,462	167,948	114.9
New Jersey	503	36,055	71.7	371	7,968	494	49,708	100.6
Pennsylvania	2,043	123,411	60.4	1,501	31,058	2,000	173,796	86.9
East North Central								
Ohio	1,370	96,720	70.6	1,059	24,604	1,346	128,003	95.1
Indiana	921	64,372	69.9	734	17,818	916	95,931	104.7
Illinois	1,456	102,505	70.4	1,174	26,381	1,432	148,718	103.9
Michigan	973	57,839	59.4	749	12,220	965	90,918	94.2
Wisconsin	899	57,259	63.7	739	16,182	890	84,337	94.8
West North Central								
Minnesota	748	38,633	51.6	597	11,666	732	63,850	87.2
Iowa	923	52,358	56.7	765	16,579	912	81,990	89.9
Missouri	766	50,626	66.1	625	13,646	764	76,513	100.1
North Dakota	387	23,689	61.2	318	6,817	384	32,564	84.8
South Dakota	333	15,246	45.8	271	8,979	318	37,338	117.4
Nebraska	459	27,222	59.3	376	7,805	450	42,214	93.8
Kansas	657	54,060	82.3	570	13,785	645	78,094	121.1
South Atlantic								
Delaware	44	3,113	70.8	34	1,000	45	5,476	121.7
Maryland	337	17,916	53.2	234	4,931	329	24,706	75.1
Dist. of Columbia	65	5,207	80.1	46	1,213	64	9,553	149.3
Virginia	583	27,507	47.2	393	6,924	572	44,198	77.3
West Virginia	362	24,900	68.8	255	5,054	357	34,011	95.3
North Carolina	422	32,396	76.8	320	8,903	417	46,518	111.6
South Carolina	242	10,936	45.2	179	3,421	242	19,815	81.9
Georgia	451	30,974	68.7	354	8,068	450	52,898	117.6
Florida	327	28,037	85.7	255	6,972	322	39,332	122.1
East South Central								
Kentucky	270	18,138	67.2	217	4,342	267	29,098	109.0
Tennessee	257	18,780	73.1	197	4,043	251	21,983	87.6
Alabama	326	26,011	79.8	245	5,089	330	38,571	116.9
Mississippi	258	14,497	56.2	213	4,951	247	28,135	113.9
West South Central								
Arkansas	314	23,616	75.2	260	7,329	319	35,005	109.7
Louisiana	193	18,407	95.4	155	5,185	193	28,744	148.9
Oklahoma	339	41,812	123.3	277	9,797	333	57,758	173.4
Texas	1,143	89,970	78.7	960	27,810	1,139	151,665	133.2
Mountain								
Montana	231	17,865	77.3	195	3,883	232	26,374	113.7
Idaho	198	11,042	55.8	160	2,530	191	14,960	78.3
Wyoming	99	4,579	46.3	82	1,021	98	6,908	70.5
Colorado	366	25,417	69.4	292	6,173	365	36,007	98.6
New Mexico	116	5,287	45.6	96	1,432	118	8,862	75.1
Arizona	164	12,053	73.5	132	2,758	164	17,674	107.8
Utah	147	9,879	67.2	116	2,295	149	12,583	84.4
Nevada	47	3,394	72.2	42	992	43	5,108	118.8
Pacific								
Washington	583	32,539	55.8	424	9,317	566	44,340	78.3
Oregon	304	17,932	59.0	247	4,970	301	24,950	82.9
California	1,541	132,258	85.8	1,285	36,751	1,516	199,985	131.9
Unallocated	191	12,646	66.2	131	3,155	180	18,455	102.5
Total U. S.	25,417	1,739,043	68.4	20,045	459,001	25,079	2,592,355	103.4

[1] Special Circular No. 2502, Rubber Division, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.